Syllabus

International Doctoral Degree Program (2016-Spring Term)

	Advanced Semi Engineering 1]	inar on Mechanica	I Engineering 1	Advanced Seminar	on Mechanio
Schedule number	D51010010	Subject area	Advanced Mechanical	Required or elective	Required
Time of starting a course	Year	Day of the	Engineering Intensive	Credit(s)	4
F	Que durate Due une	week,period		Outlinet much	1
Faculty Department Offered	Graduate Progra	m for Doctoral Degre	e	Subject grade	
Department Onered		leering		grade	D1, D2, D3
Charge teacher name[Roman alphabet mark]	S1系教務委員	lkei kyomu Iin−S		Brade	
Numbering					
Objectives of class					
The seminar aims to enhance the through reviewing, reading, and of Contents of class Each student reads English tea discusses them with other stude Self Preparation and Review	e ability of each stu discussing technical chnical papers rela ents and his/her sup	udent to plan and acc papers related to his ted to his/her doct pervisor.	complish research s/her doctor thes or thesis, introdu	in the field of mecha is research topic. ces the contents of	anical engineeri
Related subjects					
Inquire this of your supervisor					
Notes for textbook					
Inquire this of your supervisor					
Notes for reference					
Goals to be achieved					
To acquire the ability of each s	tudent to discuss h	nis/her doctor thesis	research tonic a	nd topics related to	his/her resear
field with his/her supervisor and	l specialists in his/h	ier field.			nio, nor recour
To acquire the ability to write E	nglish technical pap	ers.			
Evaluation of achievement	0 11				
The achivement is evaluated ba	sed on the results o	of paper introduction,	understanding of	papers, answers to	questions, and
the contribution to discussion.			0		
Examination					
その他					
• • • •					
None during exam period					
None during exam period Details of examination					
None during exam period Details of examination Other information					
None during exam period Details of examination Other information Inquire this of your supervisor.					
None during exam period Details of examination Other information Inquire this of your supervisor. Reference URL					
None during exam period Details of examination Other information Inquire this of your supervisor. Reference URL Office hours					
None during exam period Details of examination Other information Inquire this of your supervisor. Reference URL Office hours Inquire this of your supervisor					
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None during exam period Details of examination Other information Inquire this of your supervisor. Reference URL Office hours Inquire this of your supervisor. Relations to attainment objectiv	ves of learning and o	education			
None during exam period Details of examination Other information Inquire this of your supervisor. Reference URL Office hours Inquire this of your supervisor. Relations to attainment objectiv	ves of learning and o	education			

Subject name[English]	Advanced Semir	har on Mecha	anical	Engineering 2	Advanced Seminar	on Mechanica
	Engineering 2]					
Schedule number	D51010020	Subject area		Advanced	Required or	Required
				Mechanical	elective	
				Engineering		
Time of starting a course	Year	Day of	the	Intensive	Credit(s)	1
		week.period				
Faculty	Graduate Program	n for Doctoral [Degre	e	Subject grade	2~
Department Offered	Mechanical Engin	eering			Beggining	D1, D2, D3
•		0			grade	
Charge teacher name[Roman	S1系教務委員 1	kei kyomu Iin-S	5			I
alphabet mark]						
Numbering						
Objectives of class						
				P. L. L. 2		
The seminar aims to enhance the	ne ability of each st	tudent to plan	and a	ccomplish his/he	er research in the fie	eld of mechanica
engineering through reviewing, re	ading, and discussin	ig technical pap	ers re	elated to his/her	doctor thesis resear	ch topic.
		/				
Each student reads English tec	minical papers relation	ed to his/her	uocto	r thesis, introdu	ces the contents of	the papers and
discusses them with other stude	nts and his/her sup	ervisor.				
Seir Preparation and Review						
Related subjects						
Inquire this of your supervisor.						
Notes for textbook						
Inquire this of your supervisor.						
Notes for reference						
Goals to be achieved						
To acquire the ability of each st	udent to discuss hi	is/her doctor tl	hesis	research topic a	nd topics related to	his/her researcl
field with his/her supervisor and	specialists in his/he	er field.				
To acquire the ability to write Er	iglish technical pape	ers.				
Evaluation of achievement						
The achivement is evaluated bas	ed on the results of	f paper introduc	ction,	understanding of	papers, answers to	questions, and o
the contribution to discussion.				Ū		
Examination						
その他						
None during exam period						
Details of examination						
Other information						
Inquire this of your supervisor						
Inquire this of your supervisor.						
Inquire this of your supervisor. Reference URL						
Inquire this of your supervisor. Reference URL						
Inquire this of your supervisor. Reference URL Office hours						
Inquire this of your supervisor. Reference URL Office hours Inquire this of your supervisor.						
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Inquire this of your supervisor. Reference URL Office hours Inquire this of your supervisor. Relations to attainment objective	es of learning and e	ducation				

(D51030010)Advanced Mechanical Systems[Advanced Mechanical Systems]

Subject name[English]	Advanced Mechar	nical Systems[Adva	nced Mechanical Sy	stems]	
Schedule number	D51030010	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
			Engineering		
Time of starting a course	Spring term	Day of the	Mon.2~2	Credit(s)	2
		week,period			
Faculty	Graduate Program	n for Doctoral Degre	ee	Subject grade	1~
Department Offered	Mechanical Engine	eering		Beggining	D1, D2, D3
				grade	
Charge teacher name[Roman	河村 庄造,足立	忠晴,竹市 嘉紀	. 伊勢 智彦 KAW.	AMURA Shozo, Al	DACHI Tadaharu,
alphabet mark]	TAKEICHI Yoshing	ori, ISE Tomohiko			
Numbering					

Objectives of class

The class aims to give advanced knowledge on solid mechanics, vibration engineering or tribology.

The class aims to give advanced knowledge on solid mechanics, vibration engineering or tribology.

Contents of class

Prof. S. Kawamura

From 01 to 04 week

Vibration engineering of machines and structures is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical modeling and simulation of structural vibration are understood through discussion based on the presentations.

Topics: Vibration engineering, Modeling and simulation of dynamic phenomena and so on.

Prof. T. Adachi

From 05 to 8 week

Mechanics of solids and structures including materials science is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the mechanics, and must present them. Practical mechanics and design of engineering materials and mechanical structures are understood through discussion based on the presentations. Topics: Mechanics of solids and structures, Mechanical properties of materials, Design of mechanical components and so on.

Prof. Y. Takeichi

From 9 to 12 week

Fundamentals of tribology including materials science are lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the tribology, and must present them. Practical lubrication engineering and design of sliding mechanical components are understood through discussion based on the presentations. Topics: Tribology, Lubrication engineering, Surface properties, Wear of materials, Tribological coatings and so on.

Lecturer T. Ise

From 13 to 15 week

Vibration engineering of structures and machine elements is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical data analysis and simulation of vibration are understood through discussion based on the presentations. Topics: Vibration engineering, Vibrarion data analysis, Fluid film lubrication and so on.

01 week: Guidance of this lecture

From 02 to 04 week: Prof. S. Kawamura

Vibration engineering of machines and structures is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical modeling and simulation of structural vibration are understood through discussion based on the presentations.

Topics: Vibration engineering, Modeling and simulation of dynamic phenomena and so on.

From 05 to 07 week: Prof. T. Adachi

Mechanics of solids and structures including materials science is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the mechanics, and must present them. Practical mechanics and design of engineering materials and mechanical structures are understood through discussion based on the presentations. Topics: Mechanics of solids and structures, Mechanical properties of materials, Design of mechanical components and so on.

From 08 to 10 week: Prof. Y. Takeichi

Fundamentals of tribology including materials science are lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the tribology, and must present them. Practical lubrication engineering and design of sliding mechanical components are understood through discussion based on the presentations. Topics: Tribology, Lubrication engineering, Surface properties, Wear of materials, Tribological coatings and so on.

From 11 to 13 week: Lecturer T. Ise

Vibration engineering of structures and machine elements is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical data analysis and simulation of vibration are understood through discussion based on the presentations. Topics: Vibration engineering, Vibrarion data analysis, Fluid film lubrication and so on.

From 14 to 15 week: Discussion

From 14 to 15 week. Discussion
Self Preparation and Review
Self-preparation and review are necessary.
Related subjects
Fundamental knowledge on solid mechanics, vibration engineering or tribology.
Fundamental knowledge on solid mechanics, vibration engineering or tribology.
Notes for textbook
Handouts will be prepared
Handouts will be prepared
Notes for reference
Goals to be achieved
get advanced knowledge on solid mechanics, vibration engineering or tribology.
get advanced knowledge on solid mechanics, vibration engineering or tribology.
Evaluation of achievement
A comprehensive report(70%) and discussion(30%)
Method: A comprehensive report(70%) and discussion(30%)
Level: achievement in the case upper 55 points.
Level A: upper 80 points, Level B: upper 65 points, Level C: upper 55 points
Examination
レポートで実施
By Report
Details of examination
Other information
Tadaharu Adachi: Room D-305, E-mail: adachi@me.tut.ac.jp
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Yoshinori Takeichi: Room D-304, E-Mail: takeichi@tut.jp
Tomohiko Ise: Room D-403, E-Mail: ise@me.tut.ac.jp
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Shozo Kawamura: Room D-404, E-Mail: kawamura@me.tut.ac.jp
Yoshinori Takeichi: Room D-304, E-Mail: takeichi@tut.jp
Tomohiko Ise: Room D-403, E-Mail: ise@me.tut.ac.jp
Reference URL
Office hours
ask us by E-Mail
ask us by E−Mail
Relations to attainment objectives of learning and education
Key words

solid mechanics, vibration engineering, tribology solid mechanics, vibration engineering, tribology

(D51030030)Advanced Manufacturing Processes[Advanced Manufacturing Processes]

Subject name[English]	Advanced Manufa	cturing Proce	esses[/	Advanced Manufact	uring Processes]	
Schedule number	D51030030	Subject are	a	Advanced	Required or	Elective
				Mechanical	elective	
				Engineering		
Time of starting a course	Spring term	Day of	the	Tue.2~2	Credit(s)	2
		week,period	ł			
Faculty	Graduate Program	n for Doctora	l Degre	e	Subject grade	1~
Department Offered	Mechanical Engine	eering			Beggining	D1, D2, D3
					grade	
Charge teacher name[Roman	福本 昌宏,安井	利明,伊﨑	i 昌伸	,横山 誠二 FUK	JMOTO Masahiro	o, YASUI Toshiaki,
alphabet mark]	IZAKI Masanobu,	YOKOYAMA	Seiji			
Numbering						
Objectives of class						
To understand fundamentals of	advanced technol	ogy in matei	rials jo	ining, especially be	oth with high pe	rformance coating
formation by particles deposition	and with non-meltir	ng diffusion b	onding	by Friction Stir We	lding.	
To understand fundamental scie	nce of physics and	l chemistry o	on inor	ganic thin film and	the production,	especially solution
process.						
To understand fundamentals of	advanced technol	ogy in mater	rials jo	ining, especially be	oth with high pe	rformance coating
formation by particles deposition	and with non-meltir	ng diffusion b	onding	by Friction Stir We	lding.	
To understand fundamental scie	nce of physics and	l chemistry o	on inor	ganic thin film and	the production,	especially solution
process.						
Contents of class						
1. Fundamental of thermal spray	process, Splat form	nation probler	n			
2. Process control with Transitio	n temperature & Tr	ansition pres	sure			
3. Cold spray and Aero-sol depo	sition process					
4. Fundamental of Friction Stir W	lelding, Joining betw	veen dissimilla	ar mate	erials by FSW		
5. Friction spot welding, practica	l applications of FS	W				
6. Fundamentals of thin film depo	osition					
7. Related technology for dry pro	ocess, PVD, GVD					
8. Advanced deposition process	a avaavianaa tha a					
Caboratory tour will be arranged to	o experience the a	ctual process	•			
10 Fundamental solid state physic	s-electronic state	processing				
11 Fundamental solid state physic	s-crystal structure	and symmet	rv.			
12 Soft-solution processing for th	he inorganic thin film	n production	.1 y			
13.Vapor pressure and activity.		production				
14.Dissolution of gases in metals.	Thermodvnamics ar	nd kinetics.				
15.Phase stability diagram in vario	ous solution.					
16.Extraction of valuable substan	ces and hazards fro	m industrial v	wastes			
1. Fundamental of thermal spray	process, Splat form	nation probler	n			
2. Process control with Transitio	n temperature & Tr	ansition pres	sure			
3. Cold spray and Aero-sol depo	sition process					
4. Fundamental of Friction Stir W	lelding, Joining betw	veen dissimilla	ar mate	erials by FSW		
5. Friction spot welding, practica	l applications of FS	W				
6. Fundamentals of thin film depo	osition					
7. Related technology for dry pro	ocess, PVD, CVD					
8. Advanced deposition process						
Laboratory tour will be arranged t	o experience the a	ctual process	•			
5. Thermouynamics and thermoch	emistry in solution	processing				
11 Fundamental solid state physic	s electronic state	and symmet	n			
12 Soft-solution processing for the	he inorganic thin film	n production	.ı y			
13 Vapor pressure and activity						
14.Dissolution of gases in metals	Thermodynamics ar	nd kinetics.				
15.Phase stability diagram in vario	ous solution.					
16.Extraction of valuable substan	ces and hazards fro	m industrial v	wastes			
Self Preparation and Review						
· · · ·						

Related subjects

Basic knowledge on materials joining process, solid state physics and chemistry and solution chemistry is desirable.

Basic knowledge on materials joining process, solid state physics and chemistry and solution chemistry is desirable.

Notes for textbook

Handouts will be prepared for participants.

(Reference)

Required readings will be taken from a variety of reference books and research papers.

Handouts will be prepared for participants.

(Reference)

Required readings will be taken from a variety of reference books and research papers.

Notes for reference

Goals to be achieved

Understand following items,

- -Joining mechanism between dissimilar materials
- -Features and mechanism of various joining methods
- -Features and mechanism of thick and thin film coating
- -Features of functionally gradient material and composite material
- -Fundamental thermodynamics in thin film production
- -Fundamental solid state physics in thin film
- -Fundamentals of physical chemistry for material processing

Understand following items,

- -Joining mechanism between dissimilar materials
- -Features and mechanism of various joining methods
- -Features and mechanism of thick and thin film coating
- -Features of functionally gradient material and composite material
- -Fundamental thermodynamics in thin film production
- -Fundamental solid state physics in thin film
- -Fundamentals of physical chemistry for material processing

Evaluation of achievement

Interim report & presentation (40%) and term-end report (60%). Interim report & presentation (40%) and term-end report (60%).

Examination

レポートで実施

By Report

Details of examination

Other information

Masahiro Fukumoto: Room: D-503, ext.: 6692, e-mail: fukumoto@tut.jp Toshiaki Yasui: Room: D-601, ext:6703, e-mail: yasui@tut.jp Masanobu Izaki Room: D-505, ext:6694, e-mail:m-izaki@me.tut.ac.jp Seiii Yokovama: Room: D-507, ext:6696, e-mail: yokoyama@me.tut.jp Masahiro Fukumoto: Room: D-503, ext.: 6692, e-mail: fukumoto@tut.jp Toshiaki Yasui: Room: D-601, ext:6703, e-mail: yasui@tut.jp Masanobu Izaki Room: D-505, ext:6694, e-mail:m-izaki@me.tut.ac.jp Seiji Yokoyama: Room: D-507, ext:6696, e-mail: yokoyama@me.tut.jp Reference URL http://isf.me.tut.ac.jp/ http://tf.me.tut.ac.jp http://isf.me.tut.ac.jp/

http://tf.me.tut.ac.jp

Office hours

Masahiro Fukumoto: Wednesday 18:00-18:30

Toshiaki Yasui: Monday 17:00-18:00 Masanobu Izaki: any time, but to contact me before visit

Seiji Yokoyama: Monday 17:00–18:00

Masahiro Fukumoto: Wednesday 18:00-18:30

Toshiaki Yasui: Monday 17:00-18:00

Masanobu Izaki: any time, but to contact me before visit

Seiji Yokoyama: Monday 17:00-18:00

Relations to attainment objectives of learning and education

Key words

Joining in dissimilar materials, FSW, Sutface modification, Thermal spraying, Cold spraying, Thin film, Oxide, Thermodynamics, Band structure, Crystal structure, Reaction kinetics, Waste management.

Joining in dissimilar materials, FSW, Sutface modification, Thermal spraying, Cold spraying, Thin film, Oxide, Thermodynamics, Band structure, Crystal structure, Reaction kinetics, Waste management.

(D51030050)Engineering of Intelligent Robotics[Engineering of Intelligent Robotics]

Subject	Engineering of Intelligent Robotics[Engineering of Int	elligent Robotics]		
Schedule number	D51030050	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week.period	Thu.3~3	Credit(s)	2
Faculty	Graduate Program for Doctoral Deg	gree		Subject grade	1~
Department Offered	Mechanical Engineering			Beggining grade	D1, D2, D3
Charge teacher name[Roman alphabet mark]	寺嶋 一彦, 鈴木 新一, 三好 孝典 MIYOSHI Takanori, SANO Shigenori	e, 佐野 滋則, 真 i, MASHIMO Tom	下 智昭 TERASHIM oaki	IA Kazuhiko, SU	ZUKI Shinichi,
Numbering					
Objectives of class Understand design, mea ability. Understand design, mea ability.	surement and control methods for int surement and control methods for int	telligent robots su telligent robots su	ich as autonomous ich as autonomous	mobile robots wi mobile robots wi	th human-like th human-like
Contents of class					
We provide the following	ng schedule. Because this course is	for PhD student	ts, we can conside	r the requests	from the PhD
students.					
1st week: Modeling for r 2nd week: System ident 3rd week: Observer and 4th week: Control syste 5th week: Report 1 6th week: Modelling of r 7th week: Theory of tek 8th week: Stability for d 9th week: Example of te 10th week: Report 2 11th week: Enviromenta 13th week: Enviromenta 13th week: Path plannin 14th week: Report 3 16th week: Discussion a We provide the followin students.	robot system ification and validation State Estimation m design based on model obot mechanism a-control elayed system ele-operation echanism I recognition and map building g and trajectory generation rol and conclusion ng schedule. Because this course is	for PhD student	ts, we can conside	r the requests	from the PhD
1st week: Modeling for r 2nd week: System ident 3rd week: Observer and 4th week: Control syste 5th week: Report 1 6th week: Modelling of r 7th week: Theory of tele 8th week: Stability for d 9th week: Example of te 10th week: Report 2 11th week: Enviromenta 13th week: Enviromenta 13th week: Path plannin 14th week: Motion contr 15th week: Report 3 16th week: Discussion a	robot system ification and validation State Estimation m design based on model obot mechanism e-control lelayed system ele-operation echanism I recognition and map building g and trajectory generation rol				

Self Preparation and	Review					
Read the handouts be	fore and after th	ne lecture.				
Read the handouts be	fore and after th	ne lecture.				
Related subjects						
Fundamentals of linea	r algebra, differe	ntial equation, mechani	ics, measurement	and control theory,	and robotics.	
Fundamentals of linea	r algebra, differe	ntial equation, mechani	ics, measurement	and control theory,	and robotics.	
Notes for textbook						
Handouts will be prepa	ared.					
Handouts will be prepa	ared.					
Reference1	Book title	Introduction to Auto	onomous Mobile	Robots (Intelligent	ISBN	
		Robotics and Autono	omous Agents ser	ries)		
	Author	Roland Siegwart	Publisher	MIT Press	Publish year	2004
		and Illah R.				
		Nourbakhsh				
Notes for reference						
Goals to be achieved						
(1) Understand the de	sign methods of	intelligent robots				
(2) Understand the en	vironmental reco	ogintion and measurem	ent methods for i	ntelligent robots		
(3) Understand the mo	otion plannig met	thods for intelligent rob	ots			
(4) Understand the co	ntrol methods fo	or intelligent robots				
(1) Understand the de	sign methods of	intelligent robots				
(2) Understand the en	vironmental reco	ogintion and measurem	ent methods for i	ntelligent robots		
(3) Understand the mo	otion plannig met	thods for intelligent rob	ots			
(4) Understand the co	ntrol methods fo	or intelligent robots				
Evaluation of achieve	ment					
Report (100 %)						
A: Score of the report	is 80 or higher.					
B: Score of the report	is 65 or higher.					
C: Score of the report	is 55 or higher.					
Report (100 %)	0					
• • •						
A Score of the report	is 80 or higher					
B: Score of the report	is 65 or higher.					
C: Score of the report	t is 55 or higher.					
Examination						
レポートで宝施						
By Report						
Details of examination	1					
	-					
Other information						
Shinichi Suzuki D-40	8 6678 shinichi	Mastut ac in				
Kazuhiko Terashima	0-510 6699 ter	asima@me tut ac in				
Takanori Miyoshi D-5	09 6698 miyosh	ni@me tut ac in				
Shigenori Sano D2-3	00, 0000, miyosi)6_6684_sano@r	ne tut ac in				
Shinichi Suzuki D-40	8 6678 shinichi	Plastut ac in				
Kazuhiko Terashima)-510 6699 ter	asima@me tut ac in				
Takanori Miyoshi D-5	09 6698 miyosh	ni@me tut ac in				
Shigenori Sano, D2-30	06. 6684. sano@r	ne.tut.ac.ip				
Reference URL		51				
Basic knowledge on ro	photics and cont	rol are required				
Basic knowledge on ro	photics and cont	rol are required.				
Office hours						
Contact the professor	rs by e-mail firet					
Contact the professor	rs by e-mail firet					
Relations to attainme	nt objectives of	learning and education				

Key words

Robot, Control, Sensor, Actuator, Mechanism, Mechanical system Robot, Control, Sensor, Actuator, Mechanism, Mechanical system

(D51030070)Advanced Energy Engineering[Advanced Energy Engineering]

Subject name[English]	Advanced Energy	Engineering Advand	ed Energy Engine	ering]	
Schedule number	D51030070	Subject area	Advanced	Required or	Elective
	201000070		Mechanical	elective	LIGGUIVO
			Engineering	01000110	
Time of starting a course	Spring term	Day of the	Fri 4~4	Credit(e)	2
Time of starting a course	oping term	week period	111.7 7	Ci Buit(S)	2
Faculty	Graduate Program	for Doctoral Degre		Subject grade	1~
Department Offered	Mechanical Engine	eering		Reggining	1 D1 D2 D3
				grade	51, 52, 50
Charge teacher name[Roman	北村 健三 鈴木	老司 中村 祐一	(ITAMURA Kenzo	SUZUKI Takashi N	AKAMURA Yuji
alphabet mark]		79, ID M=			
Numbering					
Objectives of class				.	
The aim of the present lecture	is to obtain advand	ced knowledge on t	he transpot and e	ffective utilization o	f thermal energy,
on the combustion of gases and s	solids, and on the at	tomization of liquids		.	
The aim of the present lecture	is to obtain advand	ced knowledge on t	he transpot and e	ffective utilization o	f thermal energy,
on the combustion of gases and s	solids, and on the at	tomization of liquids			
Contents of class					
1st week Introduction					
2nd week Introduction of combu	stion				
3rd week Physics and chemistry	of diffusion flame				
4th week Physics and chemistry	/ of premixed flame				
5th week Analytical treatment of	of combustion				
6th week Experimental techniqu	es of combustion				
7th week Introduction of heat th	ransfer				
8th week Heat transfer by cond	uction				
9th week Heat transfer by conv	ection (1)				
10th week Heat transfer by con	vection (2)				
11th week Heat transfer by radi	ation				
12th week Introdution of atomiz	ation				
13th week Physics of atomizatio	on				
14th week Experimental techniq	ues for atomization	I			
15th week Analytical treatment	of atomization				
16th week Final examination					
1st week Introduction					
2nd week Introduction of combu	stion				
3rd week Physics and chemistry	of diffusion flame				
4th week Physics and chemistry	/ of premixed flame				
5th week Analytical treatment of	of combustion				
oth week Experimental techniqu	ies of combustion				
7th week Introduction of heat th	ranster				
Sth week Heat transfer by cond	uction				
9th week Heat transfer by conv	ection (1)				
11th week Heat transfer by con	vection (2)				
12th week Heat transfer by radi	ation				
12th week Physics of stemizetic	ation				
14th week Experimental technic	ues for atomization				
15th week Apolytical treatment	of atomization	1			
16th week Final examination					
Cold Deep consting and Davids					
Sen Preparation and Review					
Related subjects					

The knowledge on "Fluid dynamics", "Combustion engineering" and "Heat transfer" is neccesary. Otherwise, students will feel difficulty to catch up with the lecture. The knowledge on "Fluid dynamics", "Combustion engineering" and "Heat transfer" is neccesary. Otherwise, students will feel

difficulty to catch up with the lecture.

Notes for textbook

(Textbooks) K.K.Kuo,"Principles of Combustion", John Wiley & Sons, 2005. W.S. Janna,"Engineering Heat Transfer (3rd Edition)", CRC Press, 2009

(Textbooks) K.K.Kuo, "Principles of Combustion", John Wiley & Sons, 2005. W.S. Janna, "Engineering Heat Transfer (3rd Edition)", CRC Press, 2009

Notes for reference

Goals to be achieved

To understand the analytical and experimental techniques to solve the practical problems concerning with Combustion, Heat Transfer and Atomization.

To understand the analytical and experimental techniques to solve the practical problems concerning with Combustion, Heat Transfer and Atomization.

Evaluation of achievement

Evaluation will be based on the score of final examination.

Evaluation will be based on the score of final examination.

Examination

レポートで実施 By Report

Details of examination

Other information

Room: D3-201, Phone: 6666 E-mail: kitamura@me.tut.ac.jp Room: D-308, phone:6667, E-mail:takashi@me.tut.ac.jp Room:D-311, phone:6647, E-mail:yuji@me.tut.ac.jp

Room: D3-201, Phone: 6666 E-mail: kitamura@me.tut.ac.jp Room: D-308, phone:6667, E-mail:takashi@me.tut.ac.jp Room:D-311, phone:6647, E-mail:yuji@me.tut.ac.jp

Reference URL

Office hours Every Friday, after the lecture to 6:00PM. Every Friday, after the lecture to 6:00PM.

Relations to attainment objectives of learning and education

Key words

Combustion, Heat Transfer, Spray and Atomization Combustion, Heat Transfer, Spray and Atomization

(D52010020)Seminar on Electrical and Electronic Information Engineering 2[Seminar on Electrical and Electronic Information Engineering 2]

Subject name[English]	Seminar on Elect	rical and Electronic	c Information Engin	eering 2[Seminar	on Electrical and
	Electronic Informa	ation Engineering 2]			
Schedule number	D52010020	Subject area	Advanced	Required or	Required
			Electrical and	elective	
			Electronic		
			Engineering		
Time of starting a course	Year	Dav of the	Intensive	Credit(s)	4
		week,period		0.001000	
Faculty	Graduate Program	n for Doctoral Degre	e	Subject grade	1~
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining	D1, D2, D3
	。 。 二 北 水 千 日 い			grade	
Charge teacher name[Roman	S2糸教務安員 2	kei kyomu lin-S			
Alphabet mark					
		<u> </u>			
The seminar aims to provide a b	road understanding	of theoretical and	experimental appro	oches related to t	the electrical and
Contents of class	caron work of fils/f	101 Master UIESIS.			
The class provides both of fundar	mental knowledge o	n the research work	of master thesis a	nd the most advan	ced results in the
related field by reading research	papers and monogra	aphs. Contents of th	ne 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 a	nnounced by individ	ual supervisors.	
Notes for reference					
Goals to be achieved					
To acquire fundamental knowledg	e on individual rese	arch fields.			
To acquire the ability of finding a	problem, the ability	of solving the prob	lem and the present	ation skill.	
Evaluation of achievement	roport				
Examination	report.				
その他					
None during exam period					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and e	ducation			
Key words					

(D52010030)Seminar on Electrical and Electronic Information Engineering 3[Seminar on Electrical and Electronic Information Engineering 3]

Subject name[English]	Seminar on Elect	rical and Electronic	Information Engin	eering 3[Seminar	on Electrical and
	Electronic Informa	ation Engineering 3]	5	-	
Schedule number	D52010030	Subject area	Advanced	Required or	Required
			Electrical and	elective	
			Electronic		
			Information		
			Engineering		
Time of starting a course	Year	Day of the week.period	Intensive	Credit(s)	1
Faculty	Graduate Progran	n for Doctoral Degre	e	Subject grade	2~
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining grade	D1, D2, D3
Charge teacher name[Roman	S2系教務委員 2	kei kvomu Iin-S		8.000	
alphabet mark]					
Numbering					
Objectives of class					
The seminar aims to provide a b	road understanding	of theoretical and	experimental appro	oches related to t	he electrical and
electronic information engineering	for the research w	vork of his/her mast	er thesis.		
Contents of class					
The class provides both of fundar	mental knowledge o	n the research work	of master thesis a	nd the most advan	ced results in the
related field by reading research	papers and monogra	aphs. Contents of th	ne class depend on	the supervisor. To	be announced by
individual supervisors.					
Self Preparation and Review					
Pelated subjects					
Noiatou subjects					
Notes for textbook					
Textbook or material will be made	available from the	supervisor. To be a	nnounced by individ	ual supervisors.	
Notes for reference					
Goals to be achieved					
To acquire fundamental knowledg	e on individual rese	arch fields.			
To acquire the ability of finding a	problem, the ability	of solving the prob	em and the present	ation skill.	
Evaluation of achievement					
Coursework, presentation and/or	report.				
Examination					
その他					
None during exam period					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and e	ducation			
Key words					
1.09 #0108					

(D52030010)Advanced Electronic Materials 1[Advanced Electronic Materials 1]

Subject nemo[English]	Advensed Electro	nia Matariala 1[Adv	anaad Elaatrania M	stariala 1]	
	Advanced Electro				El esti co
Schedule number	D52030010	Subject area	Advanced	Required or	Elective
			Electrical and	elective	
			Electronic		
			Information		
	0 1 1		Engineering	0 III ()	
lime of starting a course	Spring term	Day of the	Wed.4~4	Gredit(s)	2
Fooulty	Graduata Program	n for Doctoral Degre		Subject grade	1~
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining	
			Linginieering	grade	D1, D2, D0
Charge teacher name[Roman	福田 光男,中村	雄一,内田 裕久 F	UKUDA Mitsuo, NA	KAMURA Yuichi, U	CHIDA Hironaga
alphabet mark]					
Numbering					
Objectives of class	I				
Objective of this subject is to I	earn about the for	efront research and	d development on t	thermoelectronics	and photonics in
electronic materials.					·
Objective of this subject is to I	earn about the for	efront research and	d development on t	thermoelectronics	and photonics in
electronic materials.					
Contents of class					
1. Thermoelectronics.					
You will learn about advanced the	ermoelectronic mate	erials and area from	fundamentals to ap	plications of therm	oelectronics.
1) thermoelectronic materials, 2)	Applications and p	processing of therm	oelectronic material	s, 3) Thermoelectr	onic devices and
systems.					
 Photonics. You will learn about photonic matter photonic matreials and 2) (name Powder processing technologies You will learn about powder processing sintering, 2) micrstructute of c Thermoelectronics. You will learn about advanced the thermoelectronic materials, 2) systems. Photonics. You will learn about photonic matter photonic matreials and 2) (name Powder processing technologies You will learn about photonic matter photonic matreials and 2) (name Powder processing technologies You will learn about powder processing technologies 	erials and devices. o-) photonic devices erials eramics and 3) nan- ermoelectronic mate Applications and p erials and devices. o-) photonic devices essing techniques for	es. or electronic device: ocomposite erials and area from processing of therm s. s.	s. fundamentals to ap oelectronic material s.	plications of therm s, 3) Thermoelectr	oelectronics. onic devices and
1) sintering, 2) micrstructute of c	eramics and 3) nan	ocomposite	5.		
		-			
Self Preparation and Review					
Related subjects					
Notes for textbook					
Lecture materials will be distribut	ed.				
Lecture materials will be distribut	ed.				
Notes for reference					
Ocele to be asking a					
	outodes of	ob and development	t by loamin	the bears of m	ont roossels and
it amis at acquiring the proad Ki	nowieuge of resear	un anu uevelopmen	L DY IGATTIING ADOUT	ule bases of rece	and research and

development in various fields.
It aims at acquiring the broad knowledge of research and development by learning about the bases of recent research and
development in various fields.
Evaluation of achievement
The reports or tests will be set in each categories.
The result is evaluated from the sum of those marks.
Grades: A:80-100, B:65-79, C:55-64.
The reports or tests will be set in each categories.
The result is evaluated from the sum of those marks.
Grades: A:80-100, B:65-79, C:55-64.
Examination
レポートで実施
By Report
Details of examination
Other information
Reference URL
Reference URL
Reference URL
Reference URL Office hours
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education
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Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education Key words
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education Key words photonics, thermelectronics
Reference URL Office hours Please make an appointment via e-mail. Please make an appointment via e-mail. Relations to attainment objectives of learning and education Key words photonics, thermelectronics optoonics, thermelectronics photonics, thermelectronics

(D52030040)Advanced Electrical Systems 2[Advanced Electrical Systems 2]

Subject name[English]	Advanced Electrical Systems 2[Advanced Electrical Systems 2]							
Schedule number	D52030040	Subject area	Advanced	Required or	Elective			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	Spring term	Day of the week,period	Wed.2~2	Credit(s)	2			
Faculty	Graduate Program	n for Doctoral Degre	e	Subject grade	1~			
Department Offered	Electrical and Ele	ectronic Information	Engineering	Beggining grade	D1, D2, D3			
Charge teacher name[Roman alphabet mark]	須田 善行,稲田	須田 善行, 稲田 亮史, 村上 義信 SUDA Yoshiyuki, INADA Ryoji, MURAKAMI Yoshinobu						
Numbering								
Objectives of class								
This lecture is implemented as a	n introduction to e	electrical energy sys	stems and intended	for students and	other engineering			
disciplines. It is being useful as re	eference and self-	study guide for the	professional dealing	with this importan	t area. There are			
following three sub courses to ch	oose from.	, ,						
This lecture is implemented as a	n introduction to e	electrical energy sys	stems and intended	for students and	other engineering			
disciplines. It is being useful as re	eference and self-s	study guide for the	professional dealing	with this importan	t area. There are			
following three sub courses to ch	oose from.							
Contents of class								
Sub Course 1(Y. Suda)								
1. Fundamental concept of electri	cal energy enginee	ring						
2. Three-phase systems								
3. Power electronics								
Sub Course 2(R. Inada)	2(R. Inada)							
1. Introduction of Electrochemica	emical Energy Conversion Devices							
2. Lithium-Ion Secondary Batterie	aries							
3. Recent Trend in Electrochemic	ical Energy Conversion Devices							
Sub Course 3(Yo. Murakami)	Sustana							
2 High Voltage Engineering and E	Systems							
3 Fundamental Properties of Diel	ectrics and Electric	cal Inculating Materi	ale					
Sub Course 1(Y, Suda)								
1. Fundamental concept of electri	cal energy enginee	ring						
2. Three-phase systems	6, 6	0						
3. Power electronics								
Sub Course 2(R. Inada)								
1. Introduction of Electrochemica	l Energy Conversio	n Devices						
2. Lithium-Ion Secondary Batterie	es							
3. Recent Trend in Electrochemic	al Energy Conversi	ion Devices						
Sub Course 3(Yo. Murakami)	-							
1. Introduction of Electric Energy	Systems							
2. High Voltage Engineering and E	ectrical Insulation	aal Tooulation March	ala					
S. Fundamental Properties of Diel	ectrics and Electric	cal Insulating Materi	ais.					
Son Freparauon and Review								
Related subjects								
Basic electrical power engineering	g course is prerequ	iisite.						
Basic electrical power engineering	g course is prerequ	iisite.						
Notes for textbook								
Materials will be prepared by the	lecturer.							
Materials will be prepared by the	lecturer.							
Notes for reference								
Goals to be achieved								

Evaluation of achievement

Marks are based on examinations(100%). Marks are based on examinations(100%).

Examination

定期試験を実施(対面)

Examination(Face to Face)
Details of examination

Other information

Reference URL

(1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley)

- (2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag)
- (3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes)

(1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley)

(2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag)

(3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes)

Office hours

Relations to attainment objectives of learning and education

Key words

(D52030050)Advanced Microelectronics 1[Advanced Microelectronics 1]

Schedule number D52030050 Subject area Advanced Required or Elective Schedule number D52030050 Subject area Advanced Electrical and elective or Elective Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
Information Information Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
Time of starting a course Spring term Day of the week,period Mon.3~3 Credit(s) 2
week,period
FacultyGraduate Program for Doctoral DegreeSubject grade1~
Department OfferedElectrical and Electronic Information EngineeringBegginingD1, D2, D3
grade
Charge teacher name[Roman 澤田 和明, 村上 裕二, 関口 寛人, 髙橋 一浩 SAWADA Kazuaki, MURAKAMI Yuji,
alphabet mark J SEKIGUCHI Hiroto, TAKAHASHI Kazuhiro
Numbering
Objectives of class
From the viewpoint of deep understanding of advanced microelectronics, physics of semiconductors including material design
and an example of latest device will be lectured.
From the viewpoint of deep understanding of advanced microelectronics, physics of semiconductors including material design
and an example of latest device will be lectured.
Contents of class
a) Physics and Properties of Semiconductors
Crystal growth and device processing
Energy band engineering
Alloy semiconductor
Strain effect
Superlattice
Carrier transport phenomena
Tummeling effect
b)Metal-Semiconductor Contacts
Schottky barrier
Current transport processes
Ohmic contact
c) Integrated circuits
device processing
MEMS/NEMS
Latest MOS FETs
Current topics in IC/MEMS
a) Physics and Properties of Semiconductors
Enservised growth and device processing
Strain effect
Superlatice
Carrier transport phenomena
Tummeling effect
b)Metal-Semiconductor Contacts
Schottky barrier
Current transport processes
Ohmic contact
c) 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 quantum mechanics, thermodynamics, and electronics are desirable.

Semiconductor Physics, Master course

The basic knowledge on the quantum mechanics, thermodynamics, and electronics are desirable.

Semiconductor Physics, Master course

Notes for textbook

Physics of Semiconducotr Devices S.M.Sze, Willy Physics of Semiconducotr Devices S.M.Sze, Willy

Notes for reference

Goals to be achieved

(1) To understand fundamental aspects on microelectronics, and physics of semiconductors including material design.(2) To get the knowledge on the latest technologies on microelectronics.

(1) To understand fundamental aspects on microelectronics, and physics of semiconductors including material design.

(2) To get the knowledge on the latest technologies on microelectronics.

Evaluation of achievement

Reports (100%)

Reports (100%)

Examination レポートで実施

By Report

Details of examination

Other information

K.Sawada (C-605) sawada@ee.tut.ac.jp ext. 6739 Y.Murakami (C-607) ymurakami@ee.tut.ac.jp ext. 6741 H. Sekiguchi (C-610) sekiguchi@ee.tut.ac.jp ext. 6744 K. Takahashi (C-406) takahashi@ee.tut.ac.jp ext. 6755 K.Sawada (C-605) sawada@ee.tut.ac.jp ext. 6739 Y.Murakami (C-607) ymurakami@ee.tut.ac.jp ext. 6741 H. Sekiguchi (C-610) sekiguchi@ee.tut.ac.jp ext. 6744 K. Takahashi (C-406) takahashi@ee.tut.ac.jp ext. 6755 **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.jp/ (devision)

http://www.tut.ac.jp/english/research/research_highlights.html (research activities)

Office hours

book an apopintment by e-mail, phone, etc. book an apopintment by e-mail, phone, etc.

Relations to attainment objectives of learning and education

Key words

(D52030070)Advanced Information and Communication Systems 1[Advanced Information and Communication Systems 1]

Subject name[English]	Advanced Information and Communication Systems 1[Advanced Information and							
	Communication S	Communication Systems 1]						
Schedule number	D52030070	Subject area	Advanced	Required or	Elective			
			Electrical and	elective				
			Electronic					
			Information					
			Engineering					
Time of starting a course	Spring term	Day of the	Mon.2~2	Credit(s)	2			
		week,period						
Faculty	Graduate Progran	n for Doctoral Degre	ee	Subject grade	1~			
Department Offered	Electrical and Ele	Electrical and Electronic Information Engineering Beggining D1, D2, D3						
				grade				
Charge teacher name[Roman	大平 孝,上原 孝	§幸, 竹内 啓悟 OH	IRA Takashi, UEHA	RA Hideyuki, TAKE	UCHI Keigo			
alphabet mark]								
Numbering								

Objectives of class

Students select between the following two courses:

The first course is intended for learning how to design microwave circuits needed for advanced wireless communication systems and wireless power transmission systems. The distributed constant element theory is addressed to characterize linear circuits at high frequencies. Based on this technique, students challenge synthesis of a variety of microwave signal and power processing functions.

The second course is intended for learning mainly medium access control, multi-hop communications and other topics related to wireless networks. Students are required to give solutions of the problems which cause performance degradation. Students select between the following two courses:

The first course is intended for learning how to design microwave circuits needed for advanced wireless communication systems and wireless power transmission systems. The distributed constant element theory is addressed to characterize linear circuits at high frequencies. Based on this technique, students challenge synthesis of a variety of microwave signal and power processing functions.

The second course is intended for learning mainly medium access control, multi-hop communications and other topics related to wireless networks. Students are required to give solutions of the problems which cause performance degradation.

Contents of class

Course 1 provided by Prof. Ohira:

- 1. Transmission lines
- 2. Scattering matrix
- 3. Mizuhashi Smith chart

Course 2 provided by Prof. Uehara:

1. Medium access control protocols

- 2. Multi-hop communications
- 3. Ad hoc and sensor networks
- Course 1 provided by Prof. Ohira:
- 1. Transmission lines
- 2. Scattering matrix
- 3. Mizuhashi Smith chart

Course 2 provided by Prof. Uehara:

- 1. Medium access control protocols
- 2. Multi-hop communications

3. Ad hoc and sensor networks

Self Preparation and Review

Related subjects

Course 1:

Deep understanding on electromagnetic field theory, linear passive and reciprocal circuit theory, and sophisticated experience on complex and matrix mathematics are prerequisite.

Course 2:

The students who will take this course are supposed to have sufficient knowledge about the following; wireless digital

modulation and demodulation, radio propagation characteristic, signal processing, probability, random variables and stochastic process.

Course 1:

Deep understanding on electromagnetic field theory, linear passive and reciprocal circuit theory, and sophisticated experience on complex and matrix mathematics are prerequisite.

Course 2:

The students who will take this course are supposed to have sufficient knowledge about the following; wireless digital modulation and demodulation, radio propagation characteristic, signal processing, probability, random variables and stochastic process.

Notes for textbook

Course 1: Lecture on the blackboard without resorting to textbooks.

Course 2: Instruct in 1st class.

Course 1: Lecture on the blackboard without resorting to textbooks.

Course 2: Instruct in 1st class.

Notes for reference

Goals to be achieved

Course 1:

- Understand the distributed constant elements and concept of scattering matrix.
 - Derive frequency responses on linear RF circuits exploiting Mizuhashi Smith chart.
 - Characterize various kinds of high frequency functional circuits and compose them based upon given specifications.

Course 2:

- Understand the mechanism of medium access control and multi-hop communications
- Understand the characteristics of ad hoc and sensor networks
- Present a solution or a new application for the above

Course 1:

- Understand the distributed constant elements and concept of scattering matrix.
- Derive frequency responses on linear RF circuits exploiting Mizuhashi Smith chart.
- Characterize various kinds of high frequency functional circuits and compose them based upon given specifications.

Course 2:

- Understand the mechanism of medium access control and multi-hop communications
- Understand the characteristics of ad hoc and sensor networks
- Present a solution or a new application for the above

Evaluation of achievement

Course 1: Marks are based on the final test.

Course 2: Marks are based on reports and presentations. Course 1: Marks are based on the final test.

Course 2: Marks are based on reports and presentations.

Examination 定期試験を実施(対面)

Examination(Face to Face)

Details of examination

Other information

For e-mail address information, visit http://www.comm.ee.tut.ac.jp/ For e-mail address information, visit http://www.comm.ee.tut.ac.jp/

Reference URL

http://www.comm.ee.tut.ac.jp/

http://www.comm.ee.tut.ac.jp/

Office hours

Appoint a time slot via email

Appoint a time slot via email

Relations to attainment objectives of learning and education

Key words

microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element, wireless networks, medium access control, multi-hop

microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element, wireless networks, medium access control, multi-hop

(D53010010)Seminar on Computer Science and Engineering 1[Seminar on Computer Science and Engineering 1]

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Subject name[English]	Seminar on Computer Science and Engineering [Seminar on Computer S				ter Science and	
	Engineering I			D	D · ·	
Schedule number	053010010	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 Doctoral Degre	ee	Subject grade	1~	
Department Offered	Computer Science	e and Engineering		Beggining	D1, D2, D3	
				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 stud	lents to study bas	sic materials in dec	th. related to his/	her research subi	ects in computer	
science and engineering	·····, ····, ····	··· ····				
It is also aimed for students to a	acquire various ski	lls required in gene	ral research work	such as those for	oral presentation	
and technical discussion and writi	ing.					
Operator to of all a						
write specific contents depend	on the research a	reas students are in	nvoivea in, it is usi	ally the case for	students to read	
relevant textbooks/research pape	ers and report on t	nem, as well as to p	resent and discuss	on the research wo	ork of their own.	
Self Preparation and Review						
Consult with your advisor.						
Related subjects						
Consult with your advisor.						
Notes for textbook						
Consult with your advisor.						
Notes for reference						
Goals to be achieved						
To acquire abilities for technical	readings in English	logical thinking /ovn	lanation and clear r	recentation		
Evaluation of achievement	eaungs in English,		ianation, and clear p	resentation.		
will be evaluated by taking into accout various factors overall, such as technical explanation, question answering, discussion						
Involvements and so on.						
Examination その他						
None during exam period						
Other information						
Reference URL						
Office hours						
Belations to attainment chiesthe	o of learning and -	ducation				
Relations to attainment objective	is of learning and e	ucation				
Kay wanda						
ney words						

(D53010020)Seminar on Computer Science and Engineering 2[Seminar on Computer Science and Engineering 2]

Subject manage/right Samular of Computer Science and Engineering Apartment of Computer Science and Engineering Computer Science Computer Science and Engineering Computer Science Computer	Subject nome[English]	Sominon on Con	anutau Salamaa	and a			ten Seienee and
Engineering 21 Displace and provider and computer science and provider provider and provider and provider and provider and provider a	Subject name[English]	Seminar on Computer Science and Engineering 2[Seminar on Computer Science					ter Science and
Surjectue number under number under number	Cabadula armiteri	Engineering 2]	0k!+	1	A alvana!	De multime d	Demuised
Computer Second and Secon	Schedule number	D53010020	Subject area		Advanced	Required or	Required
The of starting a course Year Day of the Intensive Credit(a) 1 Faculty Gredute Program for Doctoral Degree Subject grade 2~ Department Offered Computer Science and Engineering Beginning D1, D2, D3 Oharge teacher name[Roman shaded for students to study basic materials in depth, related to his/her research subjects in computer science and angineering Beginning D3 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 angineering. Beginning D2 Others teacher name[Roman shifts, required in general research work, such as those for oral presentation, and technical discussion and writing. Contents departed for students to study basic materials in depth, related to his/her research work of their own. Self Preparition and Roview Consult with your advisor. Consult with your advisor. Notes for textbook Consult with your advisor. Notes for textbook Notes for textbook Consult with your advisor. Notes for textbook Consult with your advisor. Notes for freemone Consult with your advisor. Notes for textbook Consult with your advisor. Notes for freemone Consult with your advisor.					Computer	elective	
The of starting a course Year Day of the weekpariod Credit(a) 1 Faculty Graduate Program for Doctoral Degree Subject grade 2~ Department Offered Computer Science and Engineering Begining D1, D2, D3 Oharge teacher name[Roman alphabet mark] S3乘被游委員 3kei kyomu lin-S Begining D1, D2, D3 Objectives of clase The course is infended for students to study basic materials in depth, related to his/her research subjects in computer science and majneering. It is also almed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing. Contants of clase While specific contents depend on the research areas students are involved in, it is usually the case for students to read relevant toxbok/research appers and report on them, as well as to present and discuss on the research work of their own. Self Progration and Rokew Consult with your advisor. Rolest aduigets Consult with your advisor. Notes for textbook Consult with your advisor. Rolest ablexted Consult with your advisor. Rolest ablexted Consult with your advisor. Rolest to be achieved Consult with your advisor. Rolest to be achieved Consult with your advi					Science and		
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(D53030020)Speech and Language Processing[Speech and Language Processing]

Subject nemo[English]	Speech and Language Processing[Speech and Language Processing]					
Subject name[Engish]				Elective		
Schedule number	D33030020	Subject area		Advanced	required or	Elective
				Computer	elective	
				Science and		
		_	-	Engineering		-
Time of starting a course	Spring term	Day of week.period	the I	Tue.3~3	Credit(s)	2
Faculty	Graduate Program	n for Doctora	- I Degr	ee	Subject grade	1~
Department Offered	Computer Science	e and Engine	ring		Beggining	D1 D2 D3
			21118		grade	51, 52, 50
Charge teacher name[Roman alphabet mark]	秋葉 友良,山本	一公 AKIBA	Tomo	yoshi, YAMAMOTO	Kazumasa	
Numbering						
Objectives of class						
				l		
Important topics on spoken / nat	ural language proce	ssing will be	JISCUS	sea.		
Important topics on spoken / nat	ural language proce	ssing will be	discus	sed.		
Either (I) or (II) should be selecte	d.					
(I) Basic of natural language	processing / Mode	eling charact	ers /	Modeling words ,	/ Modeling senter	nces / Modeling
documents/Modeling cross-langu	age dependencies					
(II) Basic of spoken language pro-	eccing / Bacia of a	speech record	aition	/ Algorithm for cont	tinuous speech rea	ornition / Hidden
(II) Dasic of spoken language pro-	Lessing / Dasic of a					
Markov Model / Language mode	i and decoder / Sp	eech recogn	uon u	sing neural network	C Language proc	
dialog systems, Multimodal dialog	systems / Languag	ge identificati	on, Sp	eaker identification,	Spoken document	retrieval, Spoken
document summarization, Compu	ter alded language l	earning syste	m			
Either (I) or (II) should be selecte	d.					
(I) Basic of natural language	processing / Mode	eling charact	ers /	Modeling words	/ Modeling senter	nces / Modeling
documents/Modeling cross-langu	age dependencies					
(II) Pasia of analyze language ave				/ Almonithus for cont	him was an a she was	amitian / Hiddon
(II) Basic of spoken language pro		speech recog	illion .	Algorithm for con		
Markov Model / Language mode	I and decoder / Sp	eech recogn	tion u	sing neural network	s / Language proc	cessing / Spoken
dialog systems, Multimodal dialog	systems / Languag	ge identificati	on, Sp	eaker identification,	Spoken document	retrieval, Spoken
document summarization, Compu	ter aided language l	earning syste	m			
Out Deserve at 1 D 1						
Self Preparation and Review						
Related subjects						
Information theory, Formal langua	ige theory					
Information theory, Formal langua	ige theory					
Notes for textbook						
Materials will be prepared by lect	urers					
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GOAIS TO DE ACNIEVED	<u>.</u>		. /			
(I) Understand the basic concept	s of information ret	rieval and nat	ural la	ngauge processing	/ Obtain actual abi	lity to deal with a
large text corpus / Understand c	urrent methods for	the NLP appl	icatior	IS.		
(II)						

Basics: Understand the role of spoken language as an human interface / Understand hierarchical structure of spoken language / Understand the basic speech analysing methods.

Speech Recognition: Understand the relation between speech recognition and information theory / Understand the algorithm for speech recognition using DP matching / Understand the Hidden Markov Model.

Natural Language Processing: Understand the role of language model / Understand the parser for context free language. Applications: Understand the dictation system and the spoken dialog system / Understand the applications of speech technology including computer aided language learning system.

(I) Understand the basic concepts of information retrieval and natural langauge processing / Obtain actual ability to deal with a large text corpus / Understand current methods for the NLP applications.

(II)

Basics: Understand the role of spoken language as an human interface / Understand hierarchical structure of spoken language / Understand the basic speech analysing methods.

Speech Recognition: Understand the relation between speech recognition and information theory / Understand the algorithm for speech recognition using DP matching / Understand the Hidden Markov Model.

Natural Language Processing: Understand the role of language model / Understand the parser for context free language. Applications: Understand the dictation system and the spoken dialog system / Understand the applications of speech technology including computer aided language learning system.

Evaluation of achievement

Marks are based on reports (100%).

Marks are based on reports (100%).

Examination

レポートで実施 By Report<u></u>

Details of examination

Other information

(I) Tomoyosi Akiba: C-505, 44-6758, akiba@ics.tut.ac.jp
 (II) Kazumasa Yamamoto: C-506, 44-6767, yamamoto@cs.tut.ac.jp

(I) Tomoyosi Akiba: C-505, 44-6758, akiba@ics.tut.ac.jp
 (II) Kazumasa Yamamoto: C-506, 44-6767, yamamoto@cs.tut.ac.jp

Reference URL

Office hours

16:25–17:40, Tuesday and Wednesday 16:25–17:40, Tuesday and Wednesday

Relations to attainment objectives of learning and education

Key words

spoken language processing, natural language processing, human language technology spoken language processing, natural language processing, human language technology

(D53030090)Molecular Simulation[Molecular Simulation]

Subject name[English]	Molecular Simulation[Molecular Simulation]							
Subject Hamer	D53030090	Subie		a	Advanced	Required	or	Flective
	200000000			a	Computer	elective	0	LICCUVE
					Science and	0100040		
					Engineering			
Time of starting a course	Spring term	Dav	of	the	Tue 5~5	Credit(s)		2
	oping term	week.	period			0.01.000		-
Faculty	Graduate Progran	n for Do	octoral	Degre	e	Subject grad	e	1~
Department Offered	Computer Science	e and Ei	nginee	ring		Beggining	-	D1, D2, D3
						grade		
Charge teacher name[Roman	後藤 仁志,栗田	典之 0	OTO	Hitosł	ni, KURITA Noriyuki			
alphabet mark]								
Numbering								
Objectives of class	I.							
Understanding of theories for mol	lecular science and	simulati	ion tea	hnolo	ev based upon it			
The objective of this class is to	understand basis b	iophysic	cal phe	enome	na in the organisms	s based on the	cor	cept of quantum
chemistry, that is, molecular orbit	al (MO) theory. In	addition	n. the k	nowle	dge on classical mo	olecular dvnami	cs (I	MD)simulations is
understood in this class.	···· (····) ····		.,					
In achieving this objective, we w	vill attempt to acqu	ire the	eleme	entary	concepts in MO a	nd MD theory,	and	l learn about the
dynamical and electronic properti	es of biological mol	ecules s	such a	s prot	eins, RNA and DNA			
Contents of class	Ū.			•				
1)Basic Quantum Mechanics and	Molecular Simulatic	n (1st-	-3rd w	eek)				
2)Molecular Quantum Mechanics	and Applications (A	dvance	d) (4th	-8th \	week)			
3)Mathematical Foundation for ba	sic Quantum Mech	anical a	nd Coi	mputa	tional problems (9t	h-10th week)		
4)Advanced Molecular Simulation	(11th-15th week)			•	•			
Considering the preliminary know	wledge of the participates in this class, some topics from the following things will be chosen to							
be learned.								
(1) Basis and elementary concept	ots for MO and MD theory (The 1-2 weeks)							
(2) Applications of MO method to	o small molecules (The 3-4 weeks)							
(3) MO calculations for amino aci	ids and their peptides (The 5-6 weeks)							
(4) MO and MD calculations for D	DNA, RNA bases and base pairs (The 7–9 weeks)							
(5) MO and MD calculations for c	omplexes with prote	eins and	l ligand	d mole	cules (The 10-12 w	veeks)		
(6) MO and MD calculations for D	NA, RNA and their	complex	xes wi	th pro	teins (The 13–15 w	eeks)		
Self Preparation and Review								
Related subjects								
Molecular Design Engineering								
Basis knowledge about quantum	obemistry and bio	molecul		h ac	protains RNA and	DNA is require	ad /	Alco that on MD
simulations is needed	chemistry and bio	noiecuit	es suc	11 as	proteins, ninA and	DNA IS require	eu. /	AISO, THAT ON MID
Notes for textbook								
1)Quantum Chemistry								
Evring/Walter/Kimball								
Lynng, Walcor, Rinban								
2)Modern Quantum Chemistry								
Introduction to Advanced Electro	ctron Structure Theory							
A.Szabo and N.S.Ostlund								
3) Introduction to Computational	al Chemistry(2nd Edition), Frank Jensen							
教科書:資料配付								
参考書:			<i>"</i> , ,					
Molecular orbital calculations for	r amıno acids and p	eptides	, by A	nne-l	Marie Sapse			
Notes for reference								

Goals to be achieved
To understand quantum mechanics and molecular simulation, their numerical representation on computer.
The objective of this class is to understand basis biophysical phenomena in the organisms based on the concept of quantum
chemistry.
Evaluation of achievement
Presentation in the class and reports, small tests as well as creation of simulation programs.
[Evaluation basis] Students who attend all classes will be evaluated as follows:
A: Achieved all goals and obtained total points of reports, 80 or higher (out of 100 points).
B: Achieved 80 $\%$ of goals and obtained total points of reports, 65 or higher (out of 100 points).
C: Achieved 80 % of goals and obtained total points of reports, 55 or higher (out of 100 points).
Examination
その他
By Report
Details of examination
In each class, students must show the proof that they did understand the subject they learned. Sometimes, homework is given.
Other information
N. K. (F-306, 0532-44-6875), H. G. (F-307, 0532-44-6882)
連絡先
教員の居室∶F 棟 306 号室
電話番号:0532-44-6875
E-mail: kurita@cs.tut.ac.jp
Reference URL
Office hours
Wed. 13:00 to 14:30
上記の E-mail による連絡により、適宜対応する。
Relations to attainment objectives of learning and education
Key words
Molecular Orbital Theory Electronic structure of matter Quantum Walk Moecular Dyanamics Molecular Mechanics
DNA, RNA, protein, ligand, molecular orbital calculation, MM and MD simulation

(D53030150)Web Data Engineering, Advanced 1[Web Data Engineering, Advanced 1]

Subject name[English]	Web Data Engineering, Advanced 1	I[Web Data Engine	eering, Advanced 1]					
Schedule number	D53030150	Subject area	Advanced	Required or	Elective			
		-	Computer	elective				
			Science and					
			Engineering					
Time of starting a	Spring1 term	Day of the	Thu.1~1	Credit(s)	1			
Faculty	Graduate Program for Doctoral De	egree		Subject	1~			
Department Offered	Computer Science and Engineering	g		Beggining	D1, D2, D3			
Ohanna tarahan				grade				
Charge teacher	月野 雅樹 AUNU Masaki							
namelroman alphabet								
markj								
Numbering								
Objectives of class								
Data engineering techno	logies for the data (primarily on the	Web) will be discu	issed.					
Main emphasis is on the	information retrieval and data minin	ig technologies						
Data Mining technologie	s include principal component analysis	sis, supervised lea	rning such as classi	fication, unsure	rvised learning			
such as clustering and V	Neb mining technologies	, cape. noou loo						
Multimedia data process	ing will also be discussed							
The objectives of this of	ass is to let students know the stat	e-of-the art tech	nologies in data mini	ng and informat	ion retrieval			
Contents of class			noiogies in data mini		ion recreval.			
Classes will be held (the	eventionally) 7.5 times. The last time w	uill ha kant fau tha						
Classes will be held (the	orecidally) 7.5 cimes. The last time w	vill be kept for the	e exam.					
1. Information Retrieval								
Fundamental techniques	s to construct a search system, ir	ncluding how to b	ouild indices, how to	o tokenize text	s, and how to			
extract features from te	xts and images, will be considered.							
2. Data and Web Mining								
Fundamental methods fo	or data mining as well as Web mining	are discussed.						
We plan to do one or two	o assignments for data mining techn	iques inside.						
Please note that if this I	ecture is held at the same time with	n Japanese course	e, the lecture might l	be in Japanese.				
The intelligent data engi	neering technologies for aggregated	l data will be focu	sed, where the data	include both se	emi-structured			
data, such as XML and	JSON, and unstructured data (e.g.	. time series data	and the Web) are	included, but s	tructured data			
(such as SQL) are exclu	ded.							
Main amphasis is an the								
main emphasis is on the state-of-the-art technologies on data mining and information retrieval.								
For data mining technologies, both unsupervised and supervised learning methods will be discussed.								
The former includes pr	incipal component analysis, cluste	ring, Web graph i	mining, and informa	tion filtering, w	hile the latter			
includes classification ar	nd regression.							
For information retrieval	technologies, we start with traditio	nal vector space	(Bag-of-Words) mor	dels, ending with	deep learning			
hased models such as s	kin-gram (e.g. word?vec) Roth lines	ar and non-linear	dimensional reduction	on techniques	ill be covered			
In addition multimedia re	ship-gram (e.g. woruzvec), bour intear and non-linear dimensional reduction techniques will be covered.							
Self Prenaration and De	numeria remeval (50 shapes, inages, and videos) will be referred.							
It is desirable to colf at	udy as well as review fundamental	data mining tool	niques such as alway	tering clossifi-	ation principal			
ac is desirable to self-st	d regression This reserved to the		Inques sucri as clus	contracting, classific				
component analysis, and	and regression. It is recommended installing R/Python language (sometimes with Java/C++) into your							
computer, because some	, because some of the lecture materials are written in R/Python language. (R is favorable for simple visualization.)							
IL IS DESIRADIE to self-s	desirable to self-study as well as review fundamental data mining techniques such as clustering, classification, and							
regression. It should be	egression. It should be noted that the knowledge on multivariate analysis techniques such as principal component analysis is a							
prerequisite to this clas	ss. It is recommended installing $R/$	Python (also son	netimes Java/C++)	language into y	our computer,			
because some of the lec	ture materials are written in R/Pyth	non language.						
Related subjects								
Notes for textbook								

Materials will be prepared by lecturers

References:

C. D. Manning et al, Introduction to Information Retrieval, Cambridge Univ. Press
 J. Han and M. Kamber, Data Mining: Concepts and Techniques, 2nd ed, Morgan Kaufmann

Reference1	Book title	Information Retrie	ISBN	978-0-262-					
	Authou	Charles I A	Dublisher	MIT Duoso	Dublich ween	02031-2			
	Author	Clarke Gordon V	Publisher	WIT Fress	Publish year	2010			
		Cormack							
Reference2	Book title	Data Mining: Conce	pts and Techniqu	les. Third Edition	ISBN	978-0-123-			
			,pee ana reennqa			81479-1			
	Author	Jiawei Han,	Publisher	Morgan	Publish year	2011			
		Micheline		Kaufmann	-				
		Kamber, and Jian							
		Pei							
Reference3	Book title	Data Mining Pract	tical Machine Le	earning Tools and	ISBN	978-0-12-			
		Techniques, Third E	Edition	1		374856-0			
	Author	Ian H. Witten,	Publisher	Morgan	Publish year	2011			
		Eibe Frank, and		Kaufmann					
		Mark A. Hall							
Notes for reference									
Reference #4									
Litle: Modern Informat	ion Retrieval, t	he concepts and tech	nnology behind se	arch, Second Editio	nj				
Authors:Ricardo Baeza	a-Yates, Bertiei	r Ribeiro-Neto							
	Siey 01_0								
Year: 2011	51-5								
Reference #5									
Title: Google's PageRa	ank and Bevond	11							
Authors: Amy N. Lang	/ille, Carl D. Me). Mever							
Publisher: Princeton U	niversity Press								
ISBN:978-0-691-1220	02-1								
Year: 2006									
Reference #4									
Title: [[] Modern Informat	ion Retrieval, t	he concepts and tech	nnology behind se	arch, Second Editio	nj				
Authors:Ricardo Baeza	a-Yates, Bertier	r Ribeiro-Neto							
Publisher: Addison We	sley								
ISBN:978-0-321-4169	91-9								
Year:2011									
Reference #5									
Title:「Google's PageRa	ank and Beyond	IJ							
Authors: Amy N. Lang	/ille, Carl D. Me	yer							
Publisher: Princeton U	niversity Press								
ISBN:978-0-691-1220	J2-1								
rear: 2000									
Goals to be achieved	In such that the								
1 in acquire the following	knowledge that	echnologies							
2 Understand advanced	technologies f	or information retriev	al including dime	nsional reduction					
3. Design, analyze, and e	evaluate the info	ormation retrieval and	d data mining tech	nologies.					
The following items have	e to be achieve	d:							
1. Able to implement and	d apply fundame	ental data mining tecl	hnologies.						
2. Understand fundame	ental technolog	ies for information i	retrieval, making	full use of good i	ndexing (such a	as dimensional			
reduction) after properly	/ representing o	lata objects to be ret	trieved.	-					
3. Able to design, analyz	e, and evaluate	both data mining and	d information retri	ieval technologies.					
Evaluation of achieveme	ent								
Exercise (20%) and Final	exam (80%)								

A: (>=80), B: (>=65), C:(>=55)

Exercise (20%) and Final exam (80%)

A: (>=80), B: (>=65), C: (>= 55)

Examination 定期試験を実施(対面) Examination(Face to Face)

Details of examination

Other information

Masaki Aono (C-511) aono@tut.jp

Masaki Aono (C-511) aono@tut.jp

Reference URL

http://www.kde.cs.tut.ac.jp/~aono/myLecture.html http://www.kde.cs.tut.ac.jp/~aono/myLecture.html

Office hours

Anytime, but a priori email appointment is definitely preferable.

Anytime, but a priori email appointment is definitely preferable.

Relations to attainment objectives of learning and education

Programming skills with Java, C++, R, and Python might be preferable.

Programming skills with Java, C++, R, and Python might be preferable.

Key words

(D53030170)Biological Information System Engineering 1[Biological Information System Engineering 1]

Subject	Biological Information System Engineering 1[Biological Information System Engineering 1]							
Name[English] Schedule number	D53030170		Subject area	Advanced	Required or	Flective		
	00000170			Computer	elective	LICCLIVE		
				Science and	clocare			
				Engineering				
Time of starting a	Spring1 term		Day of the	Mon.4~4	Credit(s)	1		
Course	Cueduete Due							
гасицу	Graduate Pro	gram for Doctoral De	gree		grade	1~		
Department Offered	Computer Sc	Computer Science and Engineering D1, D2, D3						
Charge teacher	福村 直博 F	IKUMURA Naohiro			grade			
name[Roman alphabet								
mark]								
Numbering								
Objectives of class								
This course lectures or	n advanced stu	idies on information p	rocessing in the	nervous systems a	nd computation	al models for		
motor controls of the h	uman movemen	ts.						
This course lectures or	n advanced stu	idies on information p	rocessing in the	nervous systems a	nd computation	al models for		
motor controls of the h	uman movemen	ts.						
Contents of class								
1. Introduction to the co	omputational ne	uroscience in the mot	tor control system	า				
2. Information processin	g in the motor	system of the brain						
3-4. Motor control mode	els of the huma	n arm movements						
5-6. Models for motor p	lanning in the h	iuman arm movements	6					
7. Models for motor plar	ning in the hun	nan hand movements						
8. Examination								
 Introduction to the computational neuroscience in the motor control system Information processing in the motor system of the brain 3-4. Motor control models of the human arm movements 5-6. Models for motor planning in the human arm movements 7. Models for motor planning in the human hand movements 8. Examination 								
Self Preparation and Re	Self Preparation and Review							
Related subjects								
Notes for textbook	ĸ							
Reference1	Book title	Human Motor Contr	ol		ISBN			
	Author	David A. Bosenbaum	Publisher	Academic Press	Publish year	2010		
Notes for reference	L		I	1	l			
Goals to be achieved								
1. Understand the comp	derstand the computational processing in the motor control							
2. Understand the moto	rstand the motor control models of the human voluntary movements							
3. Understand the models for motor planning of the human voluntary movements								
1. Understand the computational processing in the motor control								
2. Understand the moto	r control model	s of the human volunt	ary movements					
3. Understand the mode	ls for motor pla	anning of the human v	oluntary movemer	nts				
Evaluation of achieveme	ənt							
Final examination (100%)), A: 100–80, B	: 79–65, C: 64–55, D (fail): 54–0					
Final examination (100%), A: 100–80, B: 79–65, C: 64–55, D (fail): 54–0								

Examination
試験期間中には何も行わない
None during exam period
Details of examination
Other information
N. Fukumura (C611, Tel: 0532-44-6772, fukumura@cs.tut.ac.jp)
N Fukumura (C611 Tel: 0532-44-6772 fukumura@cs.tut.ac.in)
Deference I IDI
nttp://www.bmcs.cs.tut.acjp
http://www.bmcs.cs.tut.ac.jp
Office hours
Monday 16:20-17:50
Monday 16:20-17:50
Relations to attainment objectives of learning and education
D1
D1
Kay worde
ray words

(D53030180)Biological Information System Engineering 2[Biological Information System Engineering 2]

Subject name[English]	Biological Int	formation System Engi	neering 2[Biologi	cal Information S	System Engineerin	g 2]
Schedule number	D53030180		Subject area	Advanced	Required o	r Flective
	200000100		Cabjoot aloa	Computer	elective	LIOOCIVO
				Colonia	BIBCUVB	
				Science a	ina	
T A A A A	0.1.01			Engineering	0	-
lime of starting a	Spring2 term	1	Day of the	Mon.4~4	Great(s)	1
course			week,period			
Faculty	Graduate Pr	ogram for Doctoral De	gree		Subject	1~
					grade	
Department Offered	Computer Se	cience and Engineering	ç.		Beggining	D1, D2, D3
					grade	
Charge teacher	堀川 順生 ト	IORIKAWA Junsei				
name[Roman alphabet						
mark]						
Numbering						
Objectives of class	1					
This course lectures on	auvanced stu	ules on information pro	boessing in the bi	ani anu nervous	systems. Neural	mechanisms for
production and transmis	sion of electri	cal signals, and brain m	ecnanisms for pi	rocessing of sens	sory information a	re studied.
Inis course lectures on	advanced stu	dies on information pro	cessing in the bi	rain and nervous	systems. Neural	mechanisms for
production and transmis	sion of electri	cal signals, and brain m	nechanisms for p	rocessing of sens	sory information a	re studied.
Contents of class						
1. Introduction to the in	formation proc	essing in the brain				
2. Structures of the ner	vous systems	and brain and neural m	nechanisms of the	e production and	transmission of e	lectrical signals
3-7.5. Brain mechanism	s for processir	ng of sensory informati	on			
8. Final examination						
1 Introduction to the in	formation proc	essing in the brain				
2 Structures of the per		and brain and neural m	achanisms of the	a production and	transmission of a	lectrical cignals
2. Structures of the her	vous systems	and brain and neural in				accurcar signais
9 Einel exemination	s for processir	ig of sensory information	on			
o. Final examination						
Self Preparation and Re	oview					
Related subjects						
Bio-physical Information	n Systems 1, B	lio-physical Information	n Systems 2			
Bio-physical Information	n Systems 1, B	lio-physical Information	n Systems 2			
Notes for textbook	-		-			
Handouts referring the	reference book	s are used				
	с					
Handouts referring the	reference book	is are used.				
	-					
Reference1	Book title	Neuroscience - Exp	loring the brain		ISBN	
	Author	Bear Connors	Publisher	Lippincott	Publish yea	r 2007
	, talioi	Paradiso		Williams	&	2007
				Wilking	a	
Deferrence?	Deals Alala	Neuweesianes - The	hiolom (of the b		ICDN	
NOIOTONCOZ		iveuroscierice - The	s biology of the bi		1901	
	Author	Gazzaniga, Ivry,	Publisher	WW Norton	& Publish yea	r 2008
		Mangun		Co Incm		
Notes for reference						
Goale to be achieved						
Goals to be achieved	nation process	ing in the new second	tomo and husin			
Goals to be achieved 1. Understand the inform	mation process	ing in the nervous sys	tems and brain			
Goals to be achieved 1. Understand the inform 2. Understand neural me	mation process echanisms of t	ing in the nervous sys he production and tran	tems and brain smission of elect	rical signals		
Goals to be achieved 1. Understand the inform 2. Understand neural me 3. Understand the brain	nation process echanisms of t mechanisms f	ing in the nervous sys he production and tran or processing of senso	tems and brain Ismission of elect ry information	rical signals		
Goals to be achieved 1. Understand the inform 2. Understand neural me 3. Understand the brain	nation process echanisms of t mechanisms f	ing in the nervous sys he production and tran or processing of senso	tems and brain smission of elect ry information	rical signals		

 Understand neural mechanisms of the production and transmission of electrical signals Understand the brain mechanisms for processing of sensory information 	
Evaluation of achievement	
[Evaluation basis] Students who attend all classes will be evaluated as follows:	
A: Achieved all goals and obtained total points of exam, 80 or higher (out of 100 points).	
B: Achieved 70 % of goals and obtained total points of exam, 65 or higher (out of 100 points).	
C: Achieved 60 % of goals and obtained total points of exam, 55 or higher (out of 100 points).	
[Evaluation basis] Students who attend all classes will be evaluated as follows:	
A: Achieved all goals and obtained total points of exam, 80 or higher (out of 100 points).	
B: Achieved 70 % of goals and obtained total points of exam, 65 or higher (out of 100 points).	
C: Achieved 60 % of goals and obtained total points of exam, 55 or higher (out of 100 points).	
Examination	
定期試験を実施(対面)	
Examination(Face to Face)	
Details of examination	
Other information	
Junsei Horikawa (F407, Tel: 0532-44-6891, horikawa@cs.tut.ac.jp)	
Junsei Horikawa (F407, Tel: 0532-44-6891, horikawa@cs.tut.ac.jp)	
Reference URL	
Office hours	
Monday 16:20-17:50	
Monday 16:20-17:50	
Relations to attainment objectives of learning and education (B)理論的・応用的知識の獲得と発展的活用能力 重要な学術・技術公野の理論・応用知識を自発的に獲得し、発展的に活用できる能力	

Key words

(D54010010)Seminar on Environmental & Life Sciences 1[Seminar on Environmental & Life Sciences 1]

Schedule number D54010010 Subject area Advanced Required or Required							
Applied elective							
Chemistry and							
Life Science							
Time of starting a course Year Day of the Intensive Credit(s) 4							
week,period							
Faculty Graduate Program for Doctoral Degree Subject grade 1~							
Department Offered Environmental and Life Sciences Beggining D1, D2, D)3						
grade							
Charge teacher name[Roman S4系教務委員 4kei kyomu lin-S							
alphabet mark]							
Numbering							
Objectives of class							
This course will provide the students with apportunities to study on his/her research subjects on advanced environmen	tal and						
This courses by reading countries and opportunities to addy of mission research adjusts of advanced of which the students	e is to						
The sciences by reasoning sciencing papers and a calle galaxies of ms/mer supervision. The am of the elession of the scalar	$\frac{13}{13}$ to						
teran tre latest knowledge and presentation shins required to his her research in the seminar as well as to deepen i	115/1161						
Understanding of advanced environmental and me sciences.							
Unicens of class	ah ara						
The students will be required to read scientific papers written by other language than bapanese, especially English, will auranotate by bio (har queenviore and to knowth and to depluy a bio (her knowth aubiot) in the compare-	cri are						
suggested by his/her supervisor, and to report and discuss deeply on his/her research subject in the seminar.							
Seir Freparation and Review							
Seminar on Environmental & Life Sciences 2							
All other relevant subjects in Advanced Environmental and Life Sciences							
Notes for textbook							
Supervisor will recommend textbooks, papers, and research materials to students.							
Notes for reference							
Goals to be achieved							
To acquire advanced 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 poster presentations relevant to papers he/she has read.							
Evaluation of achievement							
The evaluation is based on the scores of reading textbooks and scientific papers, discussions, reports and presentati	ons of						
his/her research in the seminar. His/her supervisor evaluates the scores.							
Examination							
その他							
None during exam period							
Details of examination							
Other information							
Supervisor(s)							
Reference URL							
http://ens.tut.ac.jp/en/							
Office hours							
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							

(D54010020)Seminar on Environmental & Life Sciences 2[Seminar on Environmental & Life Sciences 2]

Subject name[English]	Seminar on Enviro	onmental & Lif	e Sci	ences 2[Seminar on	Environmental & L	ife Sciences 2]	
Schedule number	D54010020	Subject are	a	Advanced	Required or	Required	
				Applied	elective		
				Chemistry and			
				Life Science			
Time of starting a course	Year	Day of week,period	the	Intensive	Credit(s)	1	
Faculty	Graduate Program	n for Doctoral	Degre	ee	Subject grade	2~	
Department Offered	Environmental and	d Life Science	S		Beggining grade	D1, D2, D3	
Charge teacher name[Roman	S4系教務委員 4	kei kyomu Iin-	S		-		
alphabet mark]							
Numbering							
Objectives of class							
This course will provide the stude	ents with opportunit	ties to study (on his	/her research subje	ects on advanced e	nvironmental and	
life sciences by reading scientific	napers under the a	uidance of his	s/her	supervisor The aim	of the lessen for t	he students is to	
expand the knowledge and preser	tation skills acquire	d in Seminar	on Fn	vironmental and Life	Science 1.		
Contents of class							
The students will be required to	read scientific pape	ers written bv	othe	r language than Jan	anese, especially F	nglish, which are	
suggested by his/her supervisor.	and to report and d	liscuss deeply	on hi	s/her research subi	ect in the seminar.		
Self Preparation and Review							
Related subjects							
Sominar on Environmental & Life	Saianaga 1						
All other relevant subjects in Adv	anced Environment	al and Life Se	ionoo	~			
Notes for textbook			lence	>			
Supervisor will recommend textbo	oke papers and re	coarch materi	ale to	students			
Notes for reference	joks, papers, and re	search materi		students.			
Ocele to be achieved							
			_				
To acquire advanced knowledge of	on environmental an	d life sciences	s 				
To understand the contents of so	cientific papers in a	given field of	enviro	nmental and life sci	ences		
To be able to make oral and post	er presentations rei	evant to pape	15 116/	she has reau.			
Evaluation of achievement							
The evaluation is based on the	scores of reading t	extbooks and	scier	tific papers discus	sions, reports and	presentations of	
his/her research in the seminar.	His/her supervisor e	evaluates the	score	s.			
Examination	•						
その他							
None during exam period							
Details of examination							
Other information							
Supervisor(s)							
Reference URL							
http://ens.tut.ac.jp/en/							
Office hours							
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							

(D54030010)Advanced Environmental Technology 1[Advanced Environmental Technology 1]

Subject name[English]	Advanced Env	vironmental Technol	ogy 1[Advanced	Environmental Techr	nology 1]		
Schedule number	D54030010		Subject area	Advanced	Required or	Elective	
				Applied	elective		
				Chemistry and			
				Life Science			
Time of starting a course	Spring term		Day of the week,period	Mon.3~3	Credit(s)	2	
Faculty	Graduate Pro	gram for Doctoral D	egree		Subject grade	1~	
Department Offered	Environmenta	and Life Sciences			Beggining grade	D1, D2, D3	
Charge teacher	田中 三郎, 高	5島 和則,有吉 誠	一郎 TANAKA S	aburo, TAKASHIMA	Kazunori, ARIYO	SHI Seiichiro	
name[Roman alphabet							
mark]							
Numbering							
Objectives of class							
This lecture provides a	comprehensive	overview of the imp	oortant technolo	gies for photon deteo	ction from the m	nillimeter-wave	
through the ultraviolet sp	pectral regions.						
This lecture provides a	comprehensive	overview of the imp	oortant technolo	gies for photon deteo	ction from the m	nillimeter-wave	
through the ultraviolet sp	pectral regions.						
Contents of class							
Attendance students rea	id the recomme	ndation reference b	ook 1 in advance	e and give presentation	on in a seminar f	form about any	
of the following topics.							
1. Introduction							
2. Intrinsic photoconduct	ors						
3. Extrinsic photoconduc	tors						
4 Photodiodes and other	r junction-based	detectors					
5 Amplifiers and readout	e						
6 Arrayo	.5						
0. Arrays 7. Dhotoomiosius dotoot							
7. Photoemissive detecto	ors						
8. Photography							
9. Bolometers and other	thermal detecto	ors					
10. Visible and infrared c	oherent receive	rs					
11. Submillimeter- and m	nillimeter-wave	heterodyne receiver	S				
Attendance students rea	id the recomme	ndation reference b	ook 1 in advance	e and give presentation	on in a seminar f	form about any	
of the following topics.							
1. Introduction							
2. Intrinsic photoconduct	ors						
3 Extrinsic photoconduc	tors						
4. Photodiodes and other	r junction-based	detectors					
5 Amplifiers and readout	· 9						
6 Arrays							
7 Photoamissive detectors							
0 Dhotography							
0. Filologiaphy 0. Polometers and other thermal detectors							
a. Doionecers and other thermal detectors							
11. Submillimeter and millimeter-wave betared as receivers							
Solf Dranaration and Daviou							
Related subjects							
Notes for textbook							
References are distribute	ed as needed						
References are distribute	ad as needed						
	Baala title	Detection (1111)				0 501 01000	
Reference i	BOOK LILIE	Detection of Light			12BN	0 521 81636	
						^	

	Author	George Rieke	Publisher	Cambridge University	Publish year	2003
Notes for reference				Press		
Goals to be achieved						
Evaluation of achieveme	ont					
[Evaluation basis]						
Students who attend a	all classes basi	cally will be evaluated	d as follows:			
A: Achieved 80 % of go	als and obtain	ed total points of pre	sentation and re	ports, 80 or higher (out of 100 points).
B: Achieved 65 % of go	als and obtain	ed total points of pre	sentation and re	ports, 65 or higher (out of 100 points).
C: Achieved 55 % of go	oals and obtain	ed total points of pre	sentation and re	ports, 55 or higher (out of 100 points).
[Evaluation basis]	ul alaasaa haa:	a allu will be avaluate.	d aa fallawa			
A: Achieved 80 % of re	all classes basi	ed total points of pre	as ionows.	porte 80 or higher (out of 100 points)
R: Achieved 65 % of go	als and obtain	ed total points of pre	sentation and re	ports, 65 or higher (out of 100 points)
C: Achieved 55 % of go	als and obtain	ed total points of pre	sentation and re	ports, 55 or higher (out of 100 points)
Examination						
レポートで実施						
By Report						
Details of examination						
Other information						
有吉誠一郎 Email: ariy	oshi@ens.tut.a	c.jp, G 棟 404 号室, Ø	勺線 6908			
•						
田中三郎 Email: tanaka	s@ens.tut.ac.ir	5. G 棟 605 号室. 内約	泉 6916			
高島和則 Email: takash	ima@ens.tut.ad	c.ip, G 棟 310 号室, D	内線 6921			
Seiichiro Ariyoshi, Office	e: G-404 (phor	e 6908), E-mail: ariyo	oshi@ens.tut.ac.jp	1		
Sabro Tanaka, Office: G	-605 (phone 6	916), E-mail: tanakas	@ens.tut.ac.jp			
Kazunori Takashima, Off	fice: G-310 (pł	none 6921), E-mail: ta	kashima@ens.tut	.ac.jp		
Reference URL						
http://ens.tut.ac.jp/squi	d/					
http://ens.tut.ac.jp/squi	id/					
Office hours						
Relations to attainment	objectives of	learning and educatio	n			
	-	-				
Key words						

(D54030030)Advanced Ecological Engineering[Advanced Ecological Engineering]

Subject name[English]	Advanced Ecologi	ical Engineerir	ng[Adv	anced Ecological E	ngineering]	
Schedule number	D54030030	Subject are	a	Advanced	Required or	Elective
				Applied	elective	
				Chemistry and		
				Life Science		
Time of starting a course	Spring term	Day of	the	Thu.2~2	Credit(s)	2
		week,period				
	Graduate Progran	n for Doctoral	Degre	e	Subject grade	
Department Offered	Environmental and	a Lite Science	es		Beggining	D1, D2, D3
Charge teacher name[Roman	山野 裕美 後藤	医 尚 动 大 門	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	> 東海林 老幸	NAKANO Hiromi	GOTOH Naohiro
alphabet mark]	DAIMON Hirovuki	. TOKAIRIN T	akavul	-, , , , , , , , , , , , , , , , , , ,		
Numbering						
Objectives of class						
The course provides students w	ith the opportunity	to improve t	heir le	vel in the skills(rea	ading, writing, pres	entation) through
reading current research articles.						entration, en eugn
The course provides students w	ith the opportunity	to improve t	heir le	vel in the skills(rea	ading, writing, pres	entation) through
reading current research articles.						
Contents of class						
1. Students have to select at leas	st three articles in t	he field of on	e of pr	ofessors.		
Three weeks/professor & one we	ek					
2. Students prepare both reports	and present slides.					
3. The key words will be given at	the first class.					
			_			
1. Students have to select at leas	st three articles in t	he field of on	e of pr	ofessors.		
Three weeks/professor & one we	ek					
2. Students prepare both reports	and present slides.					
3. The key words will be given at	the first class.					
Solf Dresseration and Deview						
Self Preparation and Review						
Polotod subjects						
Knowledge of environmental cher	nistry chemical eng	incoring and r	natoria	le colonoa ie daeire	blo	
Knowledge of environmental chem	histry, chemical eng	incering and r	nateria	als science is desira	ible.	
Notes for textbook	nocry, onormour ong		nacone			
No textbook will be used.						
No textbook will be used.						
Notes for reference						
Goals to be achieved						
To improve presentation skills(wri	ting of reports and	preparing of s	slides).			
To improve presentation skills(wri	ting of reports and	preparing of s	slides).			
	45					
30% Report, 70% Presentation(30-	45 min)					
Sum Report, 70% Presentation(30-	45 min)					
LANIMAGON 試験期間由にけ何も行わたい						
None during exam period						
Details of examination						
Other information						
Room # B-302, E-mail: kakuta@er	ns.tut.ac.jp					
Room # G-603, E-mail: goto@ens.tut.ac.jp						
Room # CRFC-Center 208, E-ma	il: hiromi@crfc.tut.a	c.jp				
Room # G−602, E−mail: daimon@e	ns.tut.ac.jp					
Room # G-405, E-mail: tokairin@e	ens.tut.ac.jp					
Room # B-302, E-mail: kakuta@er	ns.tut.ac.jp					
Room # G-603, E-mail: goto@ens.tut.ac.jp						

Room # CRFC-Center 208, E-mail: hiromi@crfc.tut.ac.jp Room # G-602, E-mail: daimon@ens.tut.ac.jp Room # G-405, E-mail: tokairin@ens.tut.ac.jp **Reference URL**

Office hours

Anytime, but reservation is desirable. Anytime, but reservation is desirable.

Relations to attainment objectives of learning and education

Key words

environmental chemistry, chemical engineering, materials science, sustainable engineering environmental chemistry, chemical engineering, materials science, sustainable engineering

(D54030040)Advanced Biotechnology 1[Advanced Biotechnology 1]

Subject seme[English]			Dista shuslary 1]		
Subject name_Englishj	D54030040	Subject area	Diotecnnology []	Poquired	Flective
Schedule number	004030040	Subject area	Advanced	required or	LIECTIVE
			Applied	elective	
			Chemistry and		
	0		Life Science	0 111	
Time of starting a course	Spring term	Day of the	Fri.3~3	Credit(s)	2
		week,period			
Faculty	Graduate Progra	m for Doctoral Degre	e	Subject grade	1~
Department Offered	Environmental ar	nd Life Sciences		Beggining	D1, D2, D3
				grade	
Charge teacher name[Roman	浴 俊彦,平石	『明,田中 照通	,中鉢 淳 EKI To	oshihiko, HIRAISHI	Akira, TANAKA
alphabet mark]	Terumichi, NAKA	BACHI Atsushi			
Numbering					
Objectives of class	1				
This source will provide the stu	idanta with the a	nortunity to study	on advanced life	anionana (a.r. ran	omioo molooulor
This course will provide the stu		pportunity to study	on advanced me	sciences (e.g., gen	omics, molecular
This same will meride the st	rinology).				
This course will provide the stu	utents with the o	pportunity to study	on advanced life	sciences (e.g., gen	omics, molecular
genetics, microbiology, and biotec	nnology).				
Contents of class					
In this course, the students will	be expected to re	ead several papers o	on the current prog	gress in advanced	lite science (e.g.,
genomics, molecular genetics, mic	crobiology, and biot	technology) to under	stand the frontier o	of these scientific fi	elds. This course
will be given by four instructors a	s described below	(Eki, Hiraishi, Tanaka	ı, and Nakabachi).		
1st~4th week: Genome and gene	sciences (Dr. T. Ek	i)			
5th 8th week	(Dr A	, Hiraishi)			
9th~12th week:	(Dr. T	Tanaka)			
13th~15th week: Animal-microbe	symbioses (Dr. A	Nakabachi)			
In this source, the students will	be evenented to w	Nakabacili,		waaa in advanced	life estance (e.e.
In this course, the students will	be expected to re	eau several papers (stand the fourth prog	gress in auvanceu	
genomics, molecular genetics, mic	a deseribed below	(Eki Hinsishi Temeka		in these scientific fi	eius. This course
will be given by four instructors a	s described below		i, anu makabacin).		
1st 4th week: Genome and gene	sciences (Dr. T. Ek	i)			
5th [~] 8th week:	(Dr. A.	Hiraishi)			
9th~12th week:	(Dr. T	. Tanaka)			
13th~15th week: Animal-microbe	symbioses (Dr. A.	Nakabachi)			
Self Preparation and Review					
Related subjects					
The knowledge of basis melecular	hislam, and his sh	andatur ia abaalutah			
The knowledge of basic molecular	r biology and bloch	emistry is absolutely	essential.		
The knowledge of basic molecular	r biology and bioch	emistry is absolutely	essential.		
Notes for textbook					
Papers and references will be give	en by each instruc	tor in the course.			
Papers and references will be give	en by each instruc	tor in the course.			
Notes for reference					
Goals to be achieved					
Understanding, summarizing, and	making presentatio	ons and/or reports o	n the current statu	s in advanced life s	ciences including
genomics, molecular genetics, mic	crobiology and biot	echnology.			
g					
-					
To understand the current sta	itus in advanced	lite sciences includ	ing genomics, mo	iecular genetics, i	microbiology and
biotechnology by summarizing, an	d making presenta	tions and/or reports.			
Evaluation of achievement					
Grades for the course will be bas	ed on the average	of the subject score	s (by Eki, Hiraishi, 1	Tanaka, and Nakaba	chi).
[Evaluation basis] Students who	attend all classes v	vill be evaluated as f	ollows:		
A: Achieved all goals and obtained	d total points of ev	am and reports 80 c	r higher (out of 100) points)	
B: Achieved 70% of goals and obtained	a columpoints of ex	of evam and reports	65 or higher (out of	f 100 pointe)	
D. Achieved 70% of goals and obta	ameu totai poirits c	a chain and reports,	oo or nigher (out of		

C: Achieved 60% of goals and obtained total points of exam and reports, 55 or higher (out of 100 points). Grades for the course will be based on the average of the subject scores (by Eki, Hiraishi, Tanaka, and Nakabachi).
[Evaluation basis] Students who attend all classes will be evaluated as follows: A: Achieved all goals and obtained total points of exam and reports, 80 or higher (out of 100 points). B: Achieved 70% of goals and obtained total points of exam and reports, 65 or higher (out of 100 points). C: Achieved 60% of goals and obtained total points of exam and reports, 55 or higher (out of 100 points).
Examination
試験期間中には何も行わない
None during exam period
Details of examination
Other information
Dr. Toshihiko Eki: Room: G-505, Phone: 6907, E-mail: eki@ens.tut.ac.jp
Dr. Akira Hiraishi: Room: G-503, Phone: 6913, E-mail: hiraishi@ens.tut.ac.jp
Dr. Terumichi Tanaka: Room: G-506. Phone: 6920, E-mail: terumichi-tanaka@tut.jp
Dr. Atsushi Nakabachi: Room: G-502, Phone: 6901, E-mail: nakabachi@eiiris.tut.ac.jp
Dr. Toshihiko Eki: Room: G-505, Phone: 6907, E-mail: eki@ens.tut.ac.jp
Dr. Akira Hiraishi: Room: G-503, Phone: 6913, E-mail: hiraishi@ens.tut.ac.jp
Dr. Terumichi Tanaka: Room: G-506. Phone: 6920, E-mail: terumichi-tanaka@tut.jp
Dr. Atsushi Nakabachi: Room: G-502, Phone: 6901, E-mail: nakabachi@eiiris.tut.ac.jp
Reference URL
Office hours
Please make an appointment.
Please make an appointment.
Relations to attainment objectives of learning and education
(B)理論的・応用的知識の獲得と発展的活用能力 重要な学術・技術分野の理論・応用知識を自発的に獲得し, 発展的に活用できる能力 (D)国内外において活躍できる表現力・コミュニケーションカ 論文, ロ頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現し, コミュニケーションする能力
Key words

(D54030060)Advanced Molecular Function Chemistry 1[Advanced Molecular Function Chemistry 1]

Schedule numberD54030060Subject areaAdvanced Applied Openinity and Life SciencesElective openinity and Life SciencesElective openinity and Life SciencesElective openinity and Life SciencesImage and <th>Subject name[English]</th> <th>Advanced Molecu</th> <th>lar Function Che</th> <th>mistry 1[Advanced M</th> <th colspan="6">Advanced Molecular Function Chemistry 1[Advanced Molecular Function Chemistry 1]</th>	Subject name[English]	Advanced Molecu	lar Function Che	mistry 1[Advanced M	Advanced Molecular Function Chemistry 1[Advanced Molecular Function Chemistry 1]					
Applied Chemistry and elective Chemistry and the solution of the solution solutis of the solution of the solutis of the solution of t	Schedule number	D54030060	Subject area	Advanced	Required or	Elective				
Image: Content of Spring tarm Day: of the Tuol 1 Un 1 Credit(s) 2 Fine of starting a course Spring tarm Day: of the Tuol 1 Un 1 Credit(s) 2 Paculy Graduate Program for Doctoral Degree Subject grade 1 ~ Department Offered Environmental and Life Sciences Baggining D1, D2, D3 Oharge tascher name[Roman diphabet mark] SHIBATOM Kazuta, HARAGUCHI Nacki Butter Science Butter Science Butter Science Butter Science D1, D2, D3 Otarge tascher name[Roman diphabet mark] SHIBATOM Kazuta, HARAGUCHI Nacki Butter Science D1, D2, D3 D1 D2, D3 Numbering Objectives of class SHIBATOM Kazuta, HARAGUCHI Nacki Edit Science D1 D2, D3 This course focuses on state-of-the-art technology of functional polymers and bioactive organic compounds, will be discussed. Content of oles Conteston other on the onteron on the onteron on techancon				Applied	elective					
The of starting a course Spring term Day of the Science Credit(a) 2 Facilty Gradute Program for Doctorial Degree Subject grade 1~ Department Offered Environmental and Life Sciences Beggining DI. Dz. 03 Objectives of class SHIBATOMI Kazutaka, HARAGUCHI Naoki DI. Dz. 03 Beggining DI. Dz. 04 Numbering SHIBATOMI Kazutaka, HARAGUCHI Naoki Dite Science Beggining DI. Dz. 03 Numbering SHIBATOMI Kazutaka, HARAGUCHI Naoki SHIBATOMI Kazutaka, HARAGUCHI Naoki Dite Science				Chemistry and						
Inne or tranzing a course Spring term Day or the Just, P-1 Credit(a) 2 Faculty Graduate Program for Doctoral Degree Subject grade In- Department Offered Environmental and Life Sciences Begging D1, D2, D3 grade D1, D2, D3 Brading Brading D1, D2, D3 StilbATOMI Kazutaka, HARAGUCHI Naoki StilBATOMI Kazutaka, HARAGUCHI Naoki WASA Seiji, StilbATOMI Kazutaka, HARAGUCHI Naoki WASA Seiji, StilbATOMI Kazutaka, HARAGUCHI Naoki Numbering Objectives of class This course focues on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds will be discussed. Contrast of class (1) General aspects of functional polymers (fusuo, Haraguchi) (2) Procise molecular design of hunctional polymers (fusuo, Haraguchi) (3) Proparation of highly functionalized polymers(fusuo, Haraguchi) (4) Reactive polymers/fusuo, Haraguchi) (3) Proparation of highly functionalized polymers/fusuo, Haraguchi) (4) Reactive polymers/fusuo, Haraguchi) (5) Optically active polymers/fusuo, Haraguchi) (5) Optically active polymers/fusuo, Haraguchi) (5) Ayanced Lewis and East of nuclional polymers/fusuo, Haraguchi) (7) Conanti on fighly functional polymers/f	Time of starting a	Cardina 1	Dave of the	Life Science	0	0				
Image: Instance of a part of the series of the	i ime of starting a course	Spring term	Day of the	e lue.1~1	Gredit(s)	Z				
Department Offered Environmental and Life Sciences Degin by Carl Display Display <thdisplay< th=""> Display <t< th=""><th>Faculty</th><th>Graduate Program</th><th>n for Doctoral De</th><th>gree</th><th>Subject grade</th><th>1~</th></t<></thdisplay<>	Faculty	Graduate Program	n for Doctoral De	gree	Subject grade	1~				
Product Product Charge teacher name[Coman diphabet mark] 伊津野 真一、岩佐 精二、柴富 一季、原口 健樹 ITSUNO Shnichi. IWASA Seiji. SHIBATOMI Kazutaka, HARAGUCHI Naoki SHIBATOMI Kazutaka, HARAGUCHI Naoki Numbering Objectives of class This course focuses on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds will be discussed. Content of olas Content of olas (1) General aspects of functional polymers (fusuno, Haraguchi) Synthesis and various applications of the functional polymers(fusuno, Haraguchi) (2) Precise molecular design of functional polymers(fusuno, Haraguchi) Synthesis and polymerizynthesis(fusuno, Haraguchi) (3) Reparation of hight functionalized polymers(fusuno, Haraguchi) Synthesis and structure-function relationship of biobased and biodegradable polymers(fusuno, Haraguchi) (3) Synthesis and structure-function relationship of biobased and biodegradable polymers(fusuno, Haraguchi) Synthesis of natural products (masa) (10) Transition metal complexes and 18 electron rule (lwasa) Synthesis of natural products (masa) (11) Chriel catalysts and their applications. (Shibatomi) Synthesis of natural products (lwasa) (12) Advanced organoftuvine chemistry (Shibatomi) Synthesis of natural products (wasa) (13)	Department Offered	Environmental an	d Life Sciences	0	Beggining	D1, D2, D3				
Charge tascher name(Roman ghabate mark) 伊藤野 真一、岩佐 精二、柴蒿 一本,原口 直樹 ITSUNO Shinichi, IWASA Seiji, SHIBATOMI Kazutaka, HARAGUCHI Naoki Numbering SHIBATOMI Kazutaka, HARAGUCHI Naoki Dividuas of class This course focuses on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and synthesis as for bioactive organic compounds. Synthesis and sects of functional polymers(Itsune, Haraguchi) (2) Precise molecular design of functional polymers(Itsune, Haraguchi) (3) Preparation of high functionalized polymers(Itsune, Haraguchi) (3) Rotavies organication of the functional polymers(Itsune, Haraguchi) (5) dynametric synthesis and polymers(Itsune, Haraguchi) (3) Preparation of high functionalized polymers(Itsune, Haraguchi) (5) dynametric synthesis and polymers(Itsune, Haraguchi) (3) Status and structure-function relationship of biobased and biodegradable polymers(Itsune, Haraguchi) (3) Status and their applications (S. Iwasa) (10) Chiral ataysta and their applications (S. Kolisatomi) (11) Chiral ataysta and their applications (S. Nawasi) (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organofulurine chemistry (Shibatomi) (13) Advanced organofuluorine themistry (Shibatomi) (14)					grade					
shphaber mark] SHIBATOMI Kazutaka, HARAGUCHI Naoki Numbering Objectives of class This course focuses on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds will be discussed. Content of olass Content of olass (1) General aspects of functional polymers (ftsuno, Haraguchi) Content of optimers (ftsuno, Haraguchi) (2) Procise molecular design of functional polymers(ftsuno, Haraguchi) Opparation of highy functionalized polymers(ftsuno, Haraguchi) (3) Proparation of highy functional polymers(ftsuno, Haraguchi) Synthesis and polymeris(ftsuno, Haraguchi) (3) Synthesis and structure-function relationship of biobased and biodegradable polymers(ftsuno, Haraguchi) Synthesis of natural products (wasa) (10) Transition metal complexes and 18 electron rule (wasa) Synthesis and structure-function relationship (11) Chriel cataytsta md their applications (S. Iwasa) Synthesis and structure-function relationship (12) Advanced organoctativis: (Shibatomi) Synthesis and structure-function relationship	Charge teacher name[Roman	伊津野 真一,	岩佐 精二,柴	富 一孝,原口 道	卣樹 ITSUNO Shinid	chi, IWASA Seiji,				
Numbering Objectives of class This course focuses on state-of-the-art technology of functional polymers and bioactive organic compounds. Will be discussed. Synthesis and various applications of the functional polymers and bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds will be discussed. Contents of class (1) General aspects of functional polymers (Itsuno, Haraguchi) (2) Preparation of highly functionalized polymers(Itsuno, Haraguchi) (3) Preparation of highly functionalized polymers(Itsuno, Haraguchi) (6) Asymmetric synthesis and polymeris(Itsuno, Haraguchi) (3) Proparation of highly functionalized polymers(Itsuno, Haraguchi) (3) Status and structure-function relationship of biobased and biodegradable polymers(Itsuno, Haraguchi) (3) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced Lewis acid catalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofucuring: (Shibatomi) (14) Asymmetric synthesis and polymers(Itsuno, Haraguchi) (12) Aranced carganofucuring: (Shibatomi) (13) Advanced organofucuring themistry (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) A	alphabet mark]	SHIBATOMI Kazu	itaka, HARAGUC	HI Naoki						
Objectives of class This course focuses on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds. Synthesis and subcuts of functional polymers (Itsuno, Haraguchi) (2) Precise molecular design of functional polymers(Itsuno, Haraguchi) (3) Preparation of highly functionalized polymers(Itsuno, Haraguchi) (4) Reactive polymers(Itsuno, Haraguchi) (5) Optically active polymers(Itsuno, Haraguchi) (7) Synthesis and structure-function relationship of biobased and biodegradable polymers(Itsuno, Haraguchi) (8) Diactive natural products (Iwasa) (9) Total synthesis of natural products (Iwasa) (10) Transition metal complexes and 18 electron rule (Iwasa) (11) Chrial catalysts and their applications (S. Iwasa) (12) Advanced organoctalysis. (Shibatomi) (13) Advanced organoctalysis. (Shibatomi) (14) Asymmetric synthesis of functional polymers(Itsuno, Haraguchi) (13) Advanced organoctalysis. (Shibatomi) (15) Advanced organoctalysis. (Shibatomi) (16) Advanced organoctalysis. (Numbering									
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 (6) Asymmetric synthesis and polymerization(Itsuno, Haraguchi) (7) Synthesis and structure-function relationship of biobased and biodegradable polymers(Itsuno, Haraguchi) (8) Bioactive natural products (Iwasa) (9) Total synthesis of natural products (Iwasa) (10) Transition metal complexes and 18 electron rule (Iwasa) (11) Chiral catalysts and their applications (S. Iwasa) (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. Notes for reference	(5) Optically active polymers(Itsur	no, Haraguchi)								
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 (b) Bloadcuve hatural products (wasa) (g) Total synthesis of natural products (wasa) (10) Transition metal complexes and 18 electron rule (Iwasa) (11) Chiral catalysts and their applications (S. Iwasa) (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) (16) Transition and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. Notes for reference	(7) Synthesis and structure-funct	ion relationship of I	biobased and bio	legradable polymers(I	tsuno, Haraguchi)					
 (10) Transition metal complexes and 18 electron rule (Iwasa) (11) Chiral catalysts and their applications (S. Iwasa) (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. Notes for reference	(a) Total synthesis of natural products (iw	asa) ducte (Iwasa)								
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 (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. Notes for reference	(11) Chiral catalysts and their app	lications (S. Iwasa)	()							
 (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. No textbooks are required. Notes for reference 	(12) Advanced Lewis acid catalysis. (Shibatomi)									
 (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. No textbooks are required. Notes for reference 	(13) Advanced organocatalysis. (S	Shibatomi)								
(15) Advanced organofluorine chemistry (Shibatomi) Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. No textbooks are required. Notes for reference	(14) Asymmetric synthesis of halo	ogenated compound	ls and their syntł	etic applications. (Sh	ibatomi)					
Self Preparation and Review Related subjects D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論 Notes for textbook No textbooks are required. No textbooks are required. Notes for reference	(15) Advanced organofluorine chemistry (Shibatomi)									
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M24630460 応用有機化学特論 Notes for textbook No textbooks are required. No textbooks are required. Notes for reference	M4620100 Special Tapica in Applied Organia Chemistry 1									
Notes for textbook No textbooks are required. No textbooks are required. Notes for reference	M24630460 応用有機化学特論									
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No textbooks are required. Notes for reference	No textbooks are required.									
Notes for reference	No textbooks are required.									
	Notes for reference									

Goals to be achieved To understand the latest trend of the research on functional polymers. To understand the latest trend of the research on total synthesis of natural products and their synthetic methods. To understand the latest trend of the research on functional polymers. To understand the latest trend of the research on total synthesis of natural products and their synthetic methods. **Evaluation of achievement** Presentation (50%) and discussion (50%) Presentation (50%) and discussion (50%) Examination レポートで実施 By Report Details of examination Other information S. Itsuno: itsuno@ens.tut.ac.jp 6813 S. Iwasa: office:B-506, tel: 6817, email: iwasa@ens.tut.ac.jp K. Shibatomi: shiba@ens.tut.ac.jp (room: B-507) S. Itsuno: itsuno@ens.tut.ac.jp 6813 S. Iwasa: office:B-506, tel: 6817, email: iwasa@ens.tut.ac.jp K. Shibatomi: shiba@ens.tut.ac.jp (room: B-507) **Reference URL** http://www.siorgchem.ens.tut.ac.jp/index.html http://www.siorgchem.ens.tut.ac.jp/index.html **Office hours** anytime anytime Relations to attainment objectives of learning and education Key words functional polymer, asymmetric catalyst, transition metal, organocatalyst, Lewis acid, fluorine functional polymer, asymmetric catalyst, transition metal, organocatalyst, Lewis acid, fluorine

(D55010010)Seminar on Architecture and Civil Engineering 1[Seminar on Architecture and Civil Engineering 1]

Subject name[English]	Seminar on A	robitecture and Civ	il Engineering 1[S	aminar on Arabit	ecture and Civil
Subject Hame[Engish]	Engineering 1]	ichitecture and Oiv			ecture and Olvin
Sobedule number		Subject area	Advanced	Pequired or	Pequired
	000010010	Subject area	Auvaliceu		Nequireu
			Architecture	01001140	
			Tradice and the second		
The station of the station of the state	X	Davis of the	Engineering	0	4
lime of starting a course	Year	Day of the	Intensive	Gredit(s)	4
		week,period			
Faculty	Graduate Progra	am for Doctoral Degre	ee	Subject grade	1~
Department Offered	Architecture and	d Civil Engineering		Beggining	D1, D2, D3
A				grade	
Charge teacher name Roman	S5糸教務委員	5kei kyomu lin-S			
alphabet mark					
Numbering					
Objectives of class					
All the students are required to	attend all the ser	minars. which is arrar	nged by the laborate	orv supervisor for	the special study
subjects related to the current re	esearch activity of	f the laboratory. The	scheduled program	of the seminars is	announced by the
supervisor at the guidance of the	seminar		oonoaanoa program		
Contents of class	oominar.				
Self Preparation and Review					
Related subjects					
Notes for textbook					
House for textbook					
Notes for reference					
Goals to be achieved					
Evolution of achievement					
Report					
Examination					
その他					
By Report					
Details of examination					
Other information					
Peference LIPI					
Office hours					
Relations to attainment objective	s of learning and	education			
Key werde					
ney woras					

(D55010020)Seminar on Architecture and Civil Engineering 2[Seminar on Architecture and Civil Engineering 2]

Subject nemo[Endich]	Saminan an A	ahitatuna and Ciu	il Engineering 25	and an Analait	antuna and Civil		
Subject name[English]	Seminar on Architecture and Givil Engineering 2[Seminar on Architecture and						
	Engineering 2	0.11		D	D · ·		
Schedule number	D55010020	Subject area	Advanced	Required or	Required		
			Architecture	elective			
			and Civil				
			Engineering				
Time of starting a course	Year	Day of the	Intensive	Credit(s)	1		
		week,period					
Faculty	Graduate Progra	m for Doctoral Degr	ee	Subject grade	2~		
Department Offered	Architecture and	d Civil Engineering		Beggining	D1. D2. D3		
		5 5		grade			
Charge teacher name[Roman	S5系教務委員	5kei kvomu Iin-S		G			
elnhebet merk]							
Numbering							
Rumbering							
Objectives of class							
All the students are required to	attend all the ser	ninars, which is arrai	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	announced by the		
supervisor at the guidance of the	seminar	and laboratory.	eeneaarea pregram		annoanoou by ano		
Contento of close	seminar.						
Contents of class							
Self Preparation and Review							
Pelated subjects							
Notes for textbook							
Notes Course Courses							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
Report							
Examination							
その他							
By Report							
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Other information							
Reference URI							
Office hours							
Relations to attainment chiesting	e of learning and	education					
	a of learning and	ouucauon					
Kev words							

(D55030030)Advanced Building Environmental Engineering and Building Services[Advanced Building Environmental Engineering and Building Services]

Subject	Advanced Building Environmental E	ngineering and B	uilding Services[Adv	anced Building	Environmental		
name[English]	Engineering and Building Services]						
Schedule number	D55030030	Subject area	Advanced	Required or	Elective		
			Architecture and	elective			
			Civil Engineering				
Time of starting a	Spring term	Day of the	Mon.5~5	Credit(s)	2		
course		week,period					
Faculty	Graduate Program for Doctoral Deg	ree		Subject	1~		
				grade			
Department Offered	Architecture and Civil Engineering			Beggining	D1, D2, D3		
				grade			
Charge teacher	松本 博, 都梁 和代 MAISUMOIO) Hiroshi, TSUZUP	KI Kazuyo				
name[Roman							
Alphabet mark							
Numbering							
Objectives of class							
The goal of this cour	se is to help professionals update	related to the	recent research and	d development	on life cycle		
assessment (LCA) for b	uildings, environmental symbiotic tec	hnologies, climati	c building design and	urban energy m	nanagement.		
The goal of this cour	se is to help professionals update	related to the	recent research and	d development	on life cycle		
assessment (LCA) for b	puildings, environmental symbiotic tec	hnologies, climati	c building design and	urban energy m	nanagement.		
Contents of class							
The course consists of	the following topics.						
I. Buildings and its Impa	act on the Global Environment						
2. Impact Assessment i	ndices for Buildings						
3. Life Cycle Inventory	for Buildings -						
4. Uverview of GASDEE	: Intia Taabaalagiaa (1)						
5. Environmental Symp	otic rechnologies (r)						
7 Ecological Building D	otic recritiologies (2)						
Recological Building D	sign (1)						
9 Climatic Building Des	sign (1)	3SIgn (∠) ign (1)					
10. Climatic Building De	esign (2)						
11. Sustainable Building	Design (1)						
12. Sustainable Building	(Design (2)						
13. Energy and Building	s (1)						
14. Energy and Building	s (2)						
15. Compact city -urba	15. Compact city -urban energy management-						
The course consists of the following topics.							
1. Buildings and its Impact on the Global Environment							
2. Impact Assessment indices for Buildings							
3. Life Cycle Inventory for Buildings							
4. Overview of CASBEE							
5. Environmental Symbi	otic Technologies (1)						
6. Environmental Symbiotic Technologies (2)							
7. Ecological Building Design (1)							
8. Ecological Building Design (2)							
9. Climatic Building Des	Climatic Building Design (1)						
IU. Climatic Building Design (2) 11. Sustainable Building Design (1)							
11. Sustainable Building Design (1)							
12. Sustainable Building Design (2)							
13. Energy and Buildings (1)							
14. Energy and Duilding	14. Energy and Buildings (2)						
15. Compact city –urba	n energy management						
O.K.D							
Ser Preparation and R	3VIGW						

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Related subjects

Building science: Indoo Building science: Indoo	r Air Quality a r Air Quality a	nd Ventilation, Building	and Urban Therr	mal Environment mal Environment			
Notes for textbook							
The related handouts v	will be distribut	ed					
The related handouts y	will be distribut	ed.					
Reference1	Book title	Architecture for a	Sustainable Fut	ture -All about the	ISBN		
	Dook due	Holistic Approach in	Janan-		10DIQ		
	Author	Architectural	Bublisher	Institute for	Bublich	2002	
	Aution	Institute of Japan	Fublisher	Ruilding	Fublish	2002	
		Institute of Japan		Environment and	year		
				Environment and			
				Concernation			
				Conservation			
Notes for reference							
Goals to be achieved							
Achievement level of t	his course is t	o understand the back	ground of buildin	ig's impact on the glol	oal environmen	t, the practical	
strategies for sustaina	ble building des	sign. urban energy mana	agement and so	on.			
Achievement level of t	his course is t	o understand the back	ground of buildin	g's impact on the glob	oal environmen	t. the practical	
strategies for sustaina	ble building des	sign. urban energy mana	agement and so	on.		-, [
Evaluation of achieven	nent						
Reports related to this	subject are re	viewed to evaluate the	achievement lev	vel			
Reports related to this	subject are re	wiewed to evaluate the	achievement lev	vol.			
Examination			achievement iet				
By Report							
Details of examination							
Other information							
Hiroshi Matsumoto: D-710, Phone: 0532-44-6838, Fax: 0532-44-6831, E-mail: matsu@ace.tut.ac.ip							
Hiroshi Matsumoto: D-	710, Phone: 05	532–44–6838, Fax: 0532	2–44–6831, E-ma	il: matsu@ace.tut.ac.jp	,		
Reference URL							
Hiroshi Matsumoto: http://einstein.ace.tut.ac.jp/							
Hiroshi Matsumoto: http://einstein.ace.tut.ac.jp/							
Hiroshi Matsumoto: Thurdsday 13:00-14:30							
Hiroshi Matsumoto: Th	urdsday 13:00-	-14:30					
Relations to attainmen	t objectives of	Flearning and education	n				
Key words							
climatic building design	, sustainable b	uilding design, building	energy managem	ient, energy saving			
climatic building design	ı, sustainable b	uilding design, building	energy managem	ent, energy saving			

(D55030090)Advanced Transportation Systems and Economics[Advanced Transportation Systems and Economics]

Subject name[English]	Advanced Transportation Systems and Economics[Advanced Transportation Systems and					
	Economics]					
Schedule number	D55030090)55030090 Subject area		Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of	the	Tue.2~2	Credit(s)	2
		week,perio	ł			
Faculty	Graduate Program for Doctoral Degree		Subject grade	1~		
Department Offered	Architecture and	Civil Enginee	ring		Beggining	D1, D2, D3
					grade	
Charge teacher name[Roman	宮田 譲,渋澤 博	尊幸 MIYATA	Yuzurı	I, SHIBUSAWA Hiro	yuki	
alphabet mark]						
Numbering						

Objectives of class

To obtain the advanced knowledge of theories and methods for policies and planning for the environment, cities, regions and transportation.

To obtain the advanced knowledge of theories and methods for policies and planning for the environment, cities, regions and transportation.

Contents of class

By using books, reports and papers on the environment, cities, regions and infrastructure, students learn the advanced transportation systems and transportation economics. Discussion between the lecturer and students will be performed in the lecture time.

By using books, reports and papers on the environment, cities, regions and infrastructure, students learn the advanced transportation systems and transportation economics. Discussion between the lecturer and students shall be performed in the lecture time.

Self Preparation and Review

Related subjects

Transportation systems Analysis on environmental economics Policy for industry Econometrics Transportation systems Analysis on environmental economics Policy for industry Econometrics

Notes for textbook

Textbooks and scientific papers will be announced at the start of the class.

Textbooks and scientific papers will be announced at the start of the class.

Notes for reference

Goals to be achieved

1.To understand the necessity and significance of policy and planning for the environment, cities, regions and infrastruncure.

2.To understand the concept of policy and planning for the above mentioned fields.

3.To undestand methodologies in the above mentioned fields.

1.To understand the necessity and significance of policy and planning for the environment, cities, regions and infrastruncure.

2.To understand the concept of policy and planning for the above mentioned fields. 3.To undestand methodologies in the above mentioned fields. Evaluation of achievement Home work assignments will be required. Final reports or examination will be conducted. Home work assignments shall be required. Final reports or examination shall be conducted. Examination レポートで実施 By Report **Details of examination** Other information room(B-411), miyata@ace.tut.ac.jp phone: 0532-44-6955 room(D-806), miyata@ace.tut.ac.jp phone: 0532-44-6955 **Reference URL** Hirobata: http://www.tr.ace.tut.ac.jp Miyata:http://pm.hse.tut.ac.jp/kakenA/ Shibusawa: http://www.pm.ace.tut.ac.jp Hirobata: http://www.tr.ace.tut.ac.jp Miyata:http://pm.hse.tut.ac.jp/kakenA/ Shibusawa: http://www.pm.ace.tut.ac.jp **Office hours** Yuzuru Miyata: 16:00-17:00 in every Tuesday Yuzuru Miyata: 16:00-17:00 on every Tuesday Relations to attainment objectives of learning and education (A)研究者・技術者としての正しい倫理観と社会性 研究者・技術者としての専門的・倫理的責任を自覚し、人類の幸福・健康・福祉の観点から社会における技術的課題を設定・解 決・評価する能力 (B)理論的・応用的知識の獲得と発展的活用能力 重要な学術・技術分野の理論・応用知識を自発的に獲得し、発展的に活用できる能力 (C) 広範囲の知識を有機的に連携させた研究開発能力 広範囲の知識の連携による研究開発に対する方法論を体得し、研究開発の計画立案と、それを実践できる能力 Key words planning process, social & economic evaluation method, forecasting models planning process, social & economic evaluation method, forecasting models

(D55030110)Advanced Management of Technology[Advanced Management of Technology]

Subject name[English]	Advanced Manage	ement of Technolog	v[Advanced Manage	ment of Technolog	v]		
Schedule number	D55030110	Subject area	Advanced	Required or	Elective		
			Architecture	elective			
			and Civil				
			Engineering				
Time of starting a course	Spring term	Day of the	Wed.4~4	Credit(s)	2		
		week,period					
Faculty	Graduate Progran	n for Doctoral Degr	ee	Subject grade	1~		
Department Offered	Architecture and	Civil Engineering		Beggining	D1, D2, D3		
			grade				
Charge teacher name[Roman	藤原 孝男,渋澤	博幸 FUJIWARA 1	akao, SHIBUSAWA	Hiroyuki			
alphabet mark]							
Numbering							
Objectives of class							
The main objective is to unders	tand the function o	of technological en	trepreneurship for a	commercialization o	of basic research		
results from a perspective of fina	ncial engineering.						
Especially the decision-making m	odel is examined fo	r irreversible invest	ment under uncerta	inty(Fujiwara).			
1							
In this course, students learn	the regional and ι	ırban economic mo	odeling techniques	and the urban an	d regional policv		
evaluation methodology(Shibusaw	ya).						
Contents of class							
Fujiwara							
From a view point regarding the t	echnological develo	opment as risky but	competitive investm	ent, this class has	following topics:		
1-2:Technological entrepreneurs	nip						
3–5:Investment decision							
6–8:Basic real options							
9-11:Optio valuation methods							
12-15:Application and cases							
For each week class discussion,	self-preview & revie	ew are expected.					
Shibusawa							
1–2. Urban and Regional Policy an	d Evaluation						
3–5:Modeling of the Urban and Re	gional Economic S	vstems					
6-8:Policies and the Evaluation N	lethodology	,					
9–11:Evaluation Techniques and	Tools						
12–13:Case Studies of the urban	and regional policy						
14-15:Evaluating Case Studies							
Self Preparation and Review							
Related subjects							
Fujiwara							
Management Science (English),	Operations Manag	ement (Japanese),	Real Options (Jap	anese), Game Th	eory (Japanese),		
Finance (Japanese), & Entrepren	eurship (Japanese)	,					
Shibusawa							
Economics, Policy, Simulation							
Notes for textbook							
Fujiwara							
Studying materials will be introdu	ced at first class ti	me.					
Shibusawa							
Papers will be distributed.							
Notes for reference							
Goale to be echieved							
Guais to be acriteved							
rujiwara							

1)Able to understand the concept and knowledge of management of technology.
2)Able to understand and use the real options analysis.
3)Able to apply and propose original technological management methods.
Shibusawa
Advanced Urban and Regional Economics
Advanced Economic Simulation Model
Policy Evaluation Methodology
Evaluation of achievement
Fujiwara
Evaluation method: Scoring is based on reports .
Evaluation criteria: A: 80 or higher. B: 65 or higher. C: 55 or higher (Maximum scoring 100).
Shibusawa
Policy evaluation reports must be submitted.
A: 80 Points or higher, B: 65 points or higher, C:55 points or higher, D: Less than 55 points
その他
By Report
Details of examination
Other information
Fujiwara
Office#: B-313. Phone#: 6946. e-mail: fujiwara@las.tut.ac.ip
Shihusawa
Official B=100 Dhana# 6063 a=mail biza=shibu@tutin
Onicer. D. 403, Fridner. 0303, e mail. mro-sinbuletu(jp
Office hours
Shihusawa
Siliudawa Turaday 10:00-12:00
Relations to attainment objectives of learning and education
- •
Key words
Real Options, Game Theory, & Technological Entreprneurship

(D55030130)Advanced Western Culture[Advanced Western Culture]

Subject name[English]	Advanced Wester	n Culture[Advanced	d Western Culture]	r		
Schedule number	D55030130	Subject area	Advanced	Required	or	Elective
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Spring term	Day of the	Fri.2~2	Credit(s)		2
		week,period				
Faculty	Graduate Program	n for Doctoral Degr	ee	Subject grad	e	1~
Department Offered	Architecture and	Civil Engineering		Beggining		D1, D2, D3
				grade		
Charge teacher name[Roman	相京 邦宏 AIKY(J Kunihiro				
alphabet markj						
Numbering						
Objectives of class						
Research on a history of scientifi	ic ideas in the ancie	ent world.				
Research on a history of scientifi	ic ideas in the ancie	ent world.				
Contents of class						
Lecture on a view of nature and	science in the ancie	ent world.				
Modern scinece and ancient 'scie	ence'. What are simi	larities or differnece	es between the two?	?		
Program of lecture						
1. Orientation (outline of the lea	cture)					
2. Purpose of the Series						
3. Science in Antiquity?						
4. Modern Science 1						
5. Modern Science 2						
6. History and Philosophy						
7. Building Histories 1						
8. Building Histories 2						
9. Building Histories 3						
10. Intellectual Paternities 1						
11. Intellectual Paternities 2						
12. Selective Survival of Texts						
13. Resources for History 1						
14. Resources for History 2						
15. Summery of the lecture						
Lecture on a view of nature and	science in the ancie	ent world.				
Modern scinece and ancient 'scie	ence'. What are simi	larities or differnece	es between the two?	?		
Program of lecture						
1. Orientation (outline of the lea	ture)					
2. Purpose of the Series	-					
3. Science in Antiquity?						
4. Modern Science 1						
5. Modern Science 2						
6. History and Philosophy						
7. Building Histories 1						
8. Building Histories 2						
9. Building Histories 3						
10. Intellectual Paternities 1						
11. Intellectual Paternities 2						
12. Selective Survival of Texts						
13. Resources for History 1						
14. Resources for History 2						
15. Summery of the lecture						
-						
Self Preparation and Paviaw						
Con Freparauon and Review						

Preparation & review of text
Preparation & review of text
Related subjects
Notes for textbook
Roger French, Ancient Natural History. Routledge, 1994.
Roger French, Ancient Natural History. Routledge, 1994.
Notes for reference
Goals to be achieved
(1)A correct perception of a history of science.
(2)A conprehensive grasp of the origin of scientific ideas in Western Europe.
(3)Understanding of basic terms on a history of scinece.
(4)A correct understanding of a relation between modern science and pre-modern scinece.
(b)A total appreciation of a transition of scientific ideas.
(6)A correct understanding of literature on a history of science.
(1)A correct perception of a history of science.
(2)A conprehensive grasp of the origin of scientific ideas in Western Europe.
(3)Understanding of basic terms on a history of scinece.
(4)A correct understanding of a relation between modern science and pre-modern scinece.
(5)A total appreciation of a transition of scientific ideas.
(6)A correct understanding of literature on a history of science.
Evaluation of achievement
Holding the end-of-term exams.
Holding the end-of-term exams.
Examination
レポートで実施
By Report
Details of examination
Other information
Reference URL
Office hours
pm. 1-4(Wednesday)
pm. 1-4(Wednesday)
Relations to attainment objectives of learning and education
Key words
ancient, science, history
ancient, science, history