# Syllabus

# International Master's Degree Program (2017-Spring Term)

#### (M40030010)Management Science[Management Science]

Subject name[English]	Management	Science[Managemen	t Science]			
Schedule number	M40030010		Subject area	General courses	Required or elective	Elective
Time of starting a course	Spring term		Day of the week,period	Thu.1~1	Credit(s)	2
Faculty	Graduate Pro	ogram for Master's De	egree		Subject grade	1~2
Department Offered	Mechanical E	ngineering, Architect	ure and Civil Engi	neering, Electrical	Beggining	M1, M2
	and Electro	nic Information Eng	gineering, Compu	ter Science and	grade	
Charma taaahar	Engineering, 兹西 老田口	Environmental and Li	fe Sciences			
name[Roman alphabet	膝床 子为「	UJIWARA Takao				
mark]						
Numbering	GEN_LIB5232	25				
<b>Objectives of class</b> Study objective is to lea	rn an analytica	l capability on social	and managerial pe	rspectives.		
This class introduces b capital cost.	asıc finance ki	nowledge to underst	and the manager	al idea and the too	ol for the comp	any value and
Leaching language is ma	inly dependent	on English.				
The class will disucss ab interest rate, and arbitra Class content will includ #1: baic probability, #2: normal random variat #3: geometric Brownian u #4: interest rates, #5: arbitrage trade, #6-7: Black Scholes form #8-10: additional items; o #11: valuation by expect #12: stochastic order,	out basic ideas ge theory. e following topi ole, motion, mula, dividend, jump, ed utility,	s on the valuation of cs: and volatility estimat	financial option a	s a derivative based	d on the element	ary probabiity,
<ul><li>#13: optimization model,</li><li>#14: group exercises abc</li><li>#15: group exercises abc</li><li>#16: semester examination</li></ul>	out business pla out business pr on.	an, esentation,				
Self Preparation and Rev	view					
Teaching materials will b	e uploaded at	moodle. Attending st	udents are expect	ted to complete pre	- and re−views.	investigate by
themselves, and ask the	lecturer.	0	•			0,00
Related subjects Management (undergrad Management. Notes for textbook As noted above, materia	luate), Operat	ions Management, F ded at moodle.	Real Options, Ga	me Theory, MOT,	Entrepreneursł	nip, Innovation
Reference1	Book title	An Elementary Int (3rd.ed.)	roduction to Mat	hematical Finance	ISBN	978-0-521- 19253-8
	Author	Sheldon M. Ross	Publisher	Cambridge University Press	Publish year	2011 年
Notes for reference						
<b>Goals to be achieved</b> 1) To understand the me 2) To comprehend the be 3) To value an European	eaning of norma asic model stru call option as	al random variable. Icture of Black Schol a financial derivative.	es formula.			

Evaluation of achievem	ent
Evaluation Style:	
Evaluation weight alloca	tion is planned as Semester Examination 60% and Reports 40%.
Evaluation Criteria:	
A: If students achieved	every above goals and their summed scores are equal or more than 80 (the maxim scores 100).
B:If students achieved 100).	at least $65\%$ of above goals and their summed scores are equal or more than $65$ (the maxim scores
C:If students achieved 100).	at least 55% of above goals and their summed scores are equal or more than 55 (the maxim scores
Examination	
Examination(Face to Fa	ce)
Details of examination	
Other information	
Reference URL	
Office hours	
At any time if available.	
Relations to attainment	objectives of learning and education
Key words	

#### (M40030050)Japanese Life Today[Japanese Life Today]

Subject name[English]	Japanese Life Today[Japanese Life Today]					
Schedule number	M40030050	Subject area	General	Required or	Elective	
			courses	elective		
Time of starting a course	Spring term	Day of the	Fri.1~1	Credit(s)	2	
		week,period				
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2	
Department Offered	Mechanical Eng	ineering, Architect	ture and Civil	Beggining grade	M1, M2	
	Engineering, Elec	strical and Electro	onic Information			
	Engineering, Cor	nputer Science a	and Engineering,			
	Environmental and	d Life Sciences				
Charge teacher name[Roman	S総合一教務委員	), Lim Pang Boey, 🕽	大門 裕之,穗積	直裕,井佐原 均,	福本 昌宏,岩佐	
alphabet mark]	精二, 齊藤 大樹, 髙嶋 孝明, 伊藤 公毅, 寺嶋 一彦, 武藤 浩行, 藤原 孝男, 毛利 雅子,					
	加藤 三保子, 池松 峰男 Sougou kyoiku kyomu Iin, Lim Pang Boey, DAIMON Hiroyuki,					
	HOZUMI Naohiro, ISAHARA Hitoshi, FUKUMOTO Masahiro, IWASA Seiji, SAITOH Taiki,					
	TAKASHIMA Takaaki, ITO Koki, TERASHIMA Kazuhiko, MUTO Hiroyuki, FUJIWARA Takao,					
	MOURI Masako, K	ATOH Mihoko, IKEN	IATSU Mineo			
Numbering	GEN_LIB51325					

#### Objectives of class

In this series of lectures, the excellent experts of our university from different areas will impart to the engineering students highly interesting insider knowledge. The participants will get to know Japan of today from technical, economic and social viewpoints.

#### Contents of class

1. Lim Pang Boey "Japanese Education System"

Learn about the Japanese education system and what the life of a student is like in Japan?

2. Daimon "Working in Japanese Company"

Learn and discuss about working in Japanese company and what you should do for it.

#### 3. Hozumi "Japan's Modernization Suppoted by Electric Power"

Japan's modernization started in the middle of 19 th centry when a long period of isolation policy has been terminated. Her repid growth until now has been strongly supported by electric power. Now Japan's power supply is recognized as the best quality in the world. In the lecture, history and state of the art of Japan's electric power will be presented.

4. Isahara "Computer and Japanese"

Japanese language is very much different from other languages. Problems caused by such differences during computer processing of Japanese are discussed in this lecture.

5.Fukumoto "Introduction of advanced surface modofication and welding technology in Japan"

Two advanced materials processing will be introduced. One is on the surface modification technology based on the particles deposition. Thermal spray, Cold spray and Aero-sol deposition will be explained. Another is on the welding technology based on the friction stirring. Fundamental aspects on FSW will be given in the lecture.

6. Iwasa "The Range of Organic Chemistry

I will give a talk on the following subjects as one of scene of science and technology in Japan:

♦ Organic Chemistry in Environment — Amazing Natural Products—

◆Development of Life Environment —Molecular Sensor as an Basic Technology in all of Science—

◆New Horizon of Catalytic Asymmetric Synthesis —C1 Asymmetric Catalyst—

7. Saito "Earthquake safety of buildings in Japan"

The purpose of this lecture is to understand the history of earthquake disasters in Japan and lessons learned from those disasters for the safety of buildings.

8.Takashima & Nakamori "A global company doing business in Japan"

IBM, a global enterprise, is running business in Japan more than 75 years. A history and transformation of IBM's business in Japan are introduced. A comparative analysis of IBM with TOYOTA is provided to see and think about the differences. An insight that the lecturer got from the experience of working in IBM for 32 years is also shared.

9. Ito "Progress in pure mathematics in Japan"

In this lecture, we focus on the progress in pure mathematics in Japan after World War II; especially we give a brief introduction to 1. the work done by Kunihiko Kodaira, who is the first Japanese mathematician awarded to Fields Medal, and

2. algebraic analysis, promoted strongly by Japanese mathematicians (e.g. Mike Sato, Kazuhiko Aomoto. etc.)

#### 10. Terashima "Robot in Japan"

Robot is very popular in Japan. Especially, industry robot is number one all over the world. The year of 1980 is said to be the first year of robotics in Japan. Since then, Japanese robot has been extremely developed. In this lecture, history of robotics development and state of art in robot is lectured.

#### 11. Muto "Fine Ceramics"

Fine Ceramics (also known as "advanced ceramics") are used to make components that require high levels of performance and reliability, such as advanced electronic devices and so on. In fact, Fine Ceramics support the latest technologies in diverse applications throughout modern society.

In this class, students will learn about "manufacture (Mono-zukuri)" in Japan.

#### 12. Fujiwara "Japaneses-style Business Management"

Since 1980s, Japanese management style has become popular in automobile, electrical, and electronics industries in terms of employment, promotion, and industrial relations for quality control and skill transfer. We will discuss its advantages and disadvantages.

13. Mouri "Legal interpreting in Japan"

Japan has faced the numbers of foreign national criminals along with the globalization. This class explains the criminal justice, in particular focusing on foreign national criminals and legal interpreting in Japan.

14. Kato "Japanese culture and their mind"

This lecture will provide students with an opportunity to become familiar with Japanese culture and its artifacts as well as an understanding of the differences between Japan and other countries. Students will be expected to demonstrate knowledge of the way Japanese people think or act and their cultural heritage.

15.Ikematsu "Water Pollution History"

Japan has overcome lots of pollution incidents first in the world on her way to industrialization. Ashio Mining Pollution in 1878 was the first among various cases including Itai-Itai disease and Minamata disease. In the class, students are expected to learn about Japan's water pollution history and view the world's current environmental issues through the window of it.

#### Self Preparation and Review

**Related subjects** 

N/A

Notes for textbook

#### Notes for reference

#### Goals to be achieved

1) To understand a variety of Japanese cultural, social, and engineering perspectives.

2) To evaluate and criticize Japanese characteristics from interdisciplinary viewpoints.

3) To discuss and write global understanding.

#### Evaluation of achievement

Evaluation method: scoring will be proceeded by sum of each report evaluation.

#### Evaluation criteria:

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 at least 65 % of goals and obtained total points of exam and reports, 65 or higher (out of 100 points).

C: Achieved at least 55 % of goals and obtained total points of exam and reports, 55 or higher (out of 100 points).

#### Examination

その他	
Other	
Details of examination	
Other information	
Reference URL	
Office hours	
After each class.	
Relations to attainment objectives of learning and education	
Key words	
Japan. Japanese. Culture. Religion. Politics & Economy. Technolog	v

#### (M40030080)Principles of Japanese Conversation[Principles of Japanese Conversation]

Subject name[English]	Principles of	Japanese Conversati	ion[Principles of J	lapanese Conversati	on]			
Schedule number	M40030080		Subject area	General courses	Required or elective	Elective		
Time of starting a	Spring term		Day of the	Mon.2~2	Credit(s)	2		
course			week,period					
Faculty	Graduate Pro	gram for Master's De	egree		Subject grade	1~2		
Department Offered	Mechanical E	ngineering, Architect	ure and Civil Eng	ineering, Electrical	Beggining	M1, M2		
-	and Electron	nic Information Eng	gineering, Compu	iter Science and	grade			
	Engineering, I	Environmental and Lif	fe Sciences					
Charge teacher	村松 由起子	· MURAMATSU Yukik	0					
name[Roman alphabet mark]	an alphabet							
Numbering	GEN FOR560	25						
Objectives of class	_							
This is a Basic Japanes	e conversation	class. You will learn a	elementary Janan	ese grammar to spe	ak Jananese on	campus		
Contents of class	e conversation		ciententary bapan			campus.		
Students will learn the f	ollowing lesson	c in Jananaca taxtha	ok " Basia Japan	aca for Studente Hal	kace1"			
Students will learn the h	onowing lesson	s in Japanese textbo	ok Dasic Japane	ese for Students Har	Naser .			
1. Pronunciation of Japa	inese							
2. Lesson 1 Hajimemash	ite. Watashi wa	Heren desu.						
3. Lesson 2 O-kuni wa c	lochira desuka.							
4. Lesson 3 Sore wa nar	1 desuka.							
5. Lesson 4 Watashi wa	asa koonii o no	mimasu.						
6. Lesson 5 Ima nan-ji d	esuka.							
7. Lesson 6 Ashita doko	e ikimasu ka.	Nihan a kimaahita						
0. Lesson 7 Juu-gatsu j	uu-go-nichi ni i ni dara ra imaa	winon e kimashita.						
9. Lesson & Kyoosnitsu	ni dare ga imas	u ka. waaan ka						
11 Lesson 10 Nibon e ro	u wa uoko ni ar botto no kenku	imasu ka. uu ni kimachita						
12 Lesson 11 Fuii-san w	a kireina vama	decu						
13 Lesson 12 Ryokoo w	a kireina yama a doo deshita k	uesu. a						
14 Lesson 13 Shuumatsi	u ni nani oshita	a. idesu ka						
15 Lesson 14 Ongaku ga	u suki desu ka							
The term examination								
Self Preparation and Re	view							
Preparation: Please read	d Vocabulary ar	nd Notes in each less	on.					
Review:Please memorize	"Structures"	after each lesson.						
Related subjects								
Basic Japanese Classes	s (Nihongo Hok	(oo):If you want to k	now more details	, please contact the	e International A	Affairs Division		
(Kokusaikooryuuka).								
Textbook1	Book title	Basic Japanese for	Students Hakase	e1(はかせ1)	ISBN			
	Author	Yamazaki	Publisher	3A Corporation	Publish vear			
		voshiko. Doi		(スリーエーネッ				
		mitsuru		トワーク)				
Notes for textbook	I		1	/	I	L		
Nataa fay yafammaa								
Goals to be achieved								
You will be able to comr	nunicate with J	apanese people in ea	isy Japanese.					
Evaluation of achieveme	ont							
Evaluation Weight								
Homework 40%								

#### The term examination 60% Grade A:Total score is 80 or higher B:Total score is 65 or higher C:Total score is 55 or higher

Examination

その他 Other

Details of examination

Other information

**Reference URL** 

**Office hours** Tuesday 13:00-13:30

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mech	anical Engineering I	Seminar on Mecha	nical Engineering I]		
Schedule number	M41610010	Subject area	Advanced	Required or	Required	
			Mechanical	elective		
			Engineering			
Time of starting a course	Year	Day of the week.period	Intensive	Credit(s)	4	
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~	
Department Offered	Mechanical Engin	eering		Beggining	M1	
••••	0	Ū		grade		
Charge teacher name[Roman	S1系教務委員1	kei kyomu Iin−S		+ -		
alphabet mark]						
Numbering	MEC_MAS51015					
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mechanical e	ngineering available	e for the master the	esis research of a	
student.						
Contents of class						
The class provides both of funda	amental knowledge	of his/her master t	hesis research woi	rk and the most ad	vanced results in	
the related field by reading rese	arch papers and r	nonographs. The co	ontents of the clas	ss depend on the s	supervisor. To be	
announced by individual supervise	ors.					
Self Preparation and Review						
Related subjects						
Notes for textbook						
Textbook or material will be made	available from the	supervisors.				
Notes for reference						
Goals to be achieved						
To acquire fundamental knowledg	e of individual rese	arch fields.				
To acquire the ability to find prob	lems, the ability to	solve the problems,	and the presentati	ion skill.		
Evaluation of achievement						
Coursework, presentation and/or	report.					
Examination						
None during exam period						
Details of examination						
Other information						
Reference URL						
Office hours						
Belations to attainment abjectives of learning and advection						
Relations to attainment objectives of learning and education						
Key words						

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

Subject name[English]	Seminar on Mech	anical Engineering II	Seminar on Mech	nanical Engineering II		
Schedule number	M41610020	Subject area	Advanced	Required or	Required	
			Mechanical	elective		
			Engineering			
Time of starting a course	Year	Day of the week.period	Intensive	Credit(s)	2	
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	2~2	
Department Offered	Mechanical Engin	eering		Beggining	M2	
••••	Ū.	Ū		grade		
Charge teacher name[Roman	S1系教務委員 1	kei kyomu Iin-S				
alphabet mark]						
Numbering	MEC_MAS61015					
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mechanical e	ngineering availab	le for the master the	sis research of a	
student.						
Contents of class						
The class provides both of funda	amental knowledge	of his/her master t	hesis research w	ork and the most ad	vanced results in	
the related field by reading rese	earch papers and n	nonographs. The co	ontents of the cla	ass depend on the s	upervisor. To be	
announced by individual supervise	ors.					
Self Preparation and Review						
Related subjects						
Notes for textbook						
Textbook or material will be made	available from the	supervisors				
Notes for reference						
Goals to be achieved						
To acquire fundamental knowledge	e of individual rese	arch fields				
To acquire the ability to find prob	lems the ability to	solve the problems	and the presenta	tion skill		
To acquire the ability to find prot	ionis, the ability to	solve the problems,				
Evaluation of achievement						
Coursework presentation and/or	report					
Examination	report.					
None during exam period						
Details of examination						
Other information						
Reference URL						
Office hours						
Polations to attainment objectives of learning and education						
Relations to attainment objectives of learning and education						
Key words						

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

Subject name[English]	Thesis Research	on Mechanical Engir	neering[Thesis Rese	earch on Mechanica	I Engineering]	
Schedule number	M41610030	Subject area	Advanced	Required or	Required	
			Mechanical	elective		
			Engineering			
Time of starting a course	2Years	Dav of the	Intensive	Credit(s)	6	
		week.period				
Faculty	Graduate Progra	m for Master's Degre	20	Subject grade	1~	
Department Offered	Mechanical Engir	neering		Beggining	M1 M2	
	Weenamour Engi	leering		grade	1117, 1112	
Charge teacher name[Roman alphabet mark]	S1系教務委員,	1系各教員 1kei kyoi	mu Iin−S, 1kei kakul	kyouin	<u> </u>	
Numbering						
Objectives of class						
The thesis research aims to pr	ovide a practical	experience of resea	rch work, and to	acquire research s	kills with a deep	
understanding of relevant knowle	dge.					
Contents of class						
The research subject depends	on the supervisor	and the research	group you join. Ind	dividual students w	ill have different	
research subjects. Discuss with v	our supervisor.		-			
Self Preparation and Review	I					
Delete d'autricete						
Related subjects						
Notes for textbook						
Reference and material will be av	ailable from the su	pervisor.				
Notes for reference						
Goals to be achieved						
To get comething new on individu	al waaaawah fialda					
I o develop your research skills in	icluding planning ai	nd presentation skills	S.			
Evaluation of achievement						
Examination						
その他						
Other						
Details of exemination						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
Key words						
Noy Words						

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

Subject name[English]	Thesis Research	on Mechanical Engi	neering[Thesis Res	earch on Mechanica	I Engineering]	
Schedule number	M41610030	Subject area	Advanced	Required or	Required	
		-	Mechanical	elective		
			Engineering			
Time of starting a course	2Years	Day of the week.period	Intensive	Credit(s)	6	
Faculty	Graduate Program	n for Master's Degr	ee	Subject grade	1~2	
Department Offered	Mechanical Engin	eering		Beggining	M1, M2	
Channe teachan name[Baman	01	kai kuramu lin_S		grade		
charge teacher name_roman	31 本教術安員 1	kei kyömu im-3				
Numbering	MEC MAS61015					
The thesis research aims to pr	ovide a practical e dre	experience of resea	irch work, and to	acquire research s	kills with a deep	
	ago.					
Contents of class						
The research subject depends	on the supervisor	and the research	group you join. In	dividual students w	ill have different	
research subjects. Discuss with y	our supervisor.		-			
Self Preparation and Review	-					
Related subjects						
_						
Notes for textbook						
Reference and material will be av	ailable from the sup	pervisor.				
Notes for reference						
Goals to be achieved						
To get something new on individu	al research fields.					
To develop your research skills in	ncluding planning an	d presentation skills	S.			
Evaluation of achievement						
Examination						
None during exam period						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
Key words						

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

Subject name[English]	Thesis Research	on Mechanical Engi	neering[Thesis Res	earch on Mechanica	l Engineering]	
Schedule number	M4161003T	Subject area	Advanced	Required or	Required	
			Mechanical	elective		
			Engineering			
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6	
Faculty	Graduate Progran	n for Master's Degr	ee	Subject grade	2~2	
Department Offered	Mechanical Engine	eering		Beggining	M2	
				grade		
Charge teacher name[Roman	S1系教務委員 1	kei kyomu Iin−S				
alphabet mark]						
Numbering	MEC_MAS61015					
Objectives of class						
The thesis research aims to pr	ovide a practical e	experience of resea	arch work, and to	acquire research s	kills with a deep	
understanding of relevant knowle	dge.					
Contents of class						
The research subject depends	on the supervisor	and the research	group you ioin. In	dividual students w	vill have different	
research subjects. Discuss with	our supervisor.					
Self Preparation and Review						
• • • • • • • • • • • •						
Related subjects						
Notes for textbook						
Reference and material will be av	ailable from the sup	pervisor.				
Notes for reference						
Goals to be achieved						
To get something new on individu	al research fields.					
To develop your research skills in	cluding planning an	d presentation skills	5.			
Evaluation of achievement						
Examination						
None during exam period						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
1						
Key words						

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

Subject name[English]	Seminar on Mechanical Engineering[Seminar on Mechanical Engineering]					
Schedule number	M41610040	Subject area	Advanced	Required or	Required	
			Mechanical	elective		
			Engineering			
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6	
Faculty	Graduate Program	n for Master's Degr	ee	Subject grade	2~2	
Department Offered	Mechanical Engin	eering		Beggining grade	M2	
Charge teacher name[Roman	S1系教務委員1	kei kyomu Iin-S		<b>g</b>		
alphabet mark]		,				
Numbering	MEC_MAS61015					
Objectives of class						
The seminar aims to provide a br	oad understanding	of the mechanical e	ngineering availab	le for the master the	esis research of a	
student.	Ū		0 0			
Contents of class						
The class provides both of funda	amental knowledge	of his/her master t	hesis research w	ork and the most ad	vanced results in	
the related field by reading rese	earch papers and r	nonographs. The co	ontents of the cla	ass depend on the s	supervisor. To be	
announced by individual supervise	ors.					
Self Preparation and Review						
Related subjects						
Notes for textbook						
Textbook or material will be made	e available from the	supervisors.				
Notes for reference		•				
Goals to be achieved						
To acquire fundamental knowledg	e of individual rese	arch fields.				
To acquire the ability to find prob	lems, the ability to	solve the problems	and the presenta	tion skill.		
Evaluation of achievement		•	•			
Coursework, presentation and/or	report.					
Examination						
None during exam period						
Details of examination						
Other information						
Reference URI						
Office house						
Relations to attainment objectives of learning and education						
Key words						

#### (M41610051)Internship[Internship]

Subject name[English]	Internship[Interns	ship]				
Schedule number	M41610051	Subject area	Advanced	Required or	Required	
			Mechanical	elective	-	
			Engineering			
Time of starting a course	Spring term	Day of the		Credit(s)	0	
		week,period				
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2	
Department Offered	Mechanical Engin	eering		Beggining	M2	
				grade		
Charge teacher name[Roman	S1系教務委員1	kei kyomu Iin−S				
alphabet mark]						
Numbering	MEC_MAS51015					
Objectives of class						
Students are expected to addres	ss problems in a s	pecialized field in a	company or resear	rch institute. The o	objectives of this	
subject are to experience praction	cal research and d	evelopment and to	cultivate the practi	cal problem-solvin	g ability, planning	
ability, and creativity.						
Contents of class						
In order to cultivate the practical	problem-solving a	bilitv. academic and	company/institutio	nal supervisors will	provide practical	
problems in a specialized field thr	ough close commu	nication.				
Self Preparation and Review						
Studens are expected to discuss	a preferable inters	hip topic with super	isors before startin	or it.		
Belated subjects						
Notes for textbook						
Follow instructions provided by co	ompany/institutiona	al supervisors.				
Notes for reference						
Goals to be achieved						
While engaging practical activities	s in a company or	research institution	for several months	. students are exp	ected to improve	
the practical problem-solving abil	ity, planning ability,	and creativity as we	ell as an internation	al way of thinking.		
Evaluation of achievement		-				
Comprehensive evaluation base	d on students' r	eports and evaluat	tion sheets by ac	ademic and com	pany/institutional	
supervisors.						
A: 80 or higher (out of 100 points	), B: 65 or higher (c	out of 100 points) C:	55 or higher (out of	f 100 points)		
C i i		•	<b>U</b>	•		
Eveminetion						
None during even period						
None during examination						
Other information						
Reference URL						
Office hours						
Delations to attainment attactions of learning and admention						
relations to attainment objective	is of learning and e	aucation				
Key words						

Subject mane[English]         Applied Mechanics of Materials[Applied Mechanics of Materials]         Required or elective           Schedule number         M41630030         Subject area Mechanical Engineering         Advanced Required or elective         Required or elective         Elective           Time of starting a course         Spring1 term         Day of the week.period         Tue 2~2         Credit(s)         1           Department Offered         Mechanical Engineering         Beggining grade         M1         Beggining grade         M1           Otherse         teacher elefthetime         R±0         Stablect         1~            Objectives of class         McC_MAS53025         Beggining grade         M1             Outpertse of class         To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental design of mechanical structure is lecture. Expecially, mechanics of thim-walled structures which is useful for practical design of mechanical structures is explained in detail.             Contents of class         To understand mechanics of Structures is explained in detail.              Chapter 1. Introduction Chapter 2. Automobile structure, Loading to structures Fundamental equations in solid mechanics Fundamentals of Structures for structure.         <	Subject name[English]       Applied Mechanics         Schedule number       M41630030         Time of starting a course       Spring1 term         Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge teacher name[Roman alphabet mark]       R±立 忠晴 ADACH         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       To understand mechanical performances of mechanics of solid and structure, Loading to Deformation of automobile structure, Perform Chapter 2. Automobile structure, Perform Chapter 3. Fundamentals of Structural Mecha- Fundamental equations in solid mechanics Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, t Chapter 5. Elementary Mechanics of Structural Torsion and bending of thin-walled beams Chapter 6. Mechanics of Thin-Walled Structurant Torsion and bending of thin-walled beams Chapter 7. Fundamentals of Dynamic Measurant Frequency response, Strain gage, Load cell, A Chapter 8. Summary         Self Preparation and Review       Reference1       Book title       A Fire Author         Reference2       Book title       A Fire Author       Fung T       T         Reference3       Book title       Mecharins       Fung T         Reference4       Book title       Class         Author       Fung T									
name[English]         Advanced Mechanical Biology         Required or elective Mechanical Biology         Elective Biology         Elective Biology </th <th>name[English]       M41630030         Time of starting a course       M41630030         Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge teacher name[Roman alphabet mark]       R±立 忠晴 ADACH         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       Chapter 1. Introduction         Chapter 2. Automobile Structure, Loading to Deformation of automobile structure, Perform Chapter 2. Fundamentals of Structural Mecharics Chapter 3. Fundamentals of Structural Mecharics Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of Structura Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structure Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measure Frequency response, Strain gage, Load cell, A Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mecharics         Notes for textbook         Text will be distributed on the web site. The Reference1         Book title       A Firm Author         Reference3       Book title       A Firm Author         Reference4       Book title       Tora</th> <th colspan="9">Applied Mechanics of Materials[Applied Mechanics of Materials]</th>	name[English]       M41630030         Time of starting a course       M41630030         Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge teacher name[Roman alphabet mark]       R±立 忠晴 ADACH         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       Chapter 1. Introduction         Chapter 2. Automobile Structure, Loading to Deformation of automobile structure, Perform Chapter 2. Fundamentals of Structural Mecharics Chapter 3. Fundamentals of Structural Mecharics Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of Structura Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structure Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measure Frequency response, Strain gage, Load cell, A Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mecharics         Notes for textbook         Text will be distributed on the web site. The Reference1         Book title       A Firm Author         Reference3       Book title       A Firm Author         Reference4       Book title       Tora	Applied Mechanics of Materials[Applied Mechanics of Materials]								
Schedule number         M41630030         Subject area         Advanced Required Engineering         Required elective elective         Required elective         Credits elective           Time of starting e Gourse         Spring1 term         Day of the week,paried         Tue 2~2         Credit(s)         1           Faculty         Graduate Program for Master's Degree         Subject         2         Subject         1~           Department Offered         Mechanical Engineering         Beggining grade         M1         3         3           Objectives of lase To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structures is explained in detail.         To understand mechanical performances of structures eleging of mechanical structures is explained in detail.         To understand mechanics         Frequencies           Contact of class         Charper 1. Introduction         Charper 1. Introduction         Elective         Elective           Charper 1. Automobile structures from View of Solid Mechanics         Elective         Elective         Elective           Purpase of automobile structures, fundamental of Structural Mechanics of Structures         Elective         Elective           Charper 1. Automobile structures, force, bending moment, torsional moment         Charper 1. Elective         Elective           Charper 1. Elective elective diverse	Schedule number       M41630030         Time of starting a course       Spring1 term         Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge teacher name[Roman alphabet mark]       Rec_MAS53025         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mecha-Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of Structure Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, A Chapter 8. Summary         Self Preparation and Review         Reference1       Book title       A Firm Author         Reference3       Book title       A Firm Author         Reference4       Book title       Torsion and Review					<b>E</b> 1 - 11				
Time of starting a output         Springl term         Day of the weskpord         Tue 2~2         Credit(s)         1           Faculty         Graduate Program for Master's Degree         Subject         1~           Department Offered         Mechanical Engineering         Boggining grade         M1           Oherge         teacher         Radit Status         M1           ameRoman alphabet mark]         MEC_MASS3025         M1           Objectives of class         To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanical structures is explained in detail.         Contents of class           Chapter 1. Introduction         Chapter 1. Introduction         Chapter 2. Automobile structure. Performance of automobile structure           Defaret 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment. Crisional moment.           Chapter 5. Elementary Mechanics of Thur-Walled Structures         Torsion and bending of thin-walled barns           Chapter 6. Mechanics of Thin-Walled Structures         Structure Structure Structure Structure Structure Structures           Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain ggag, Load cell, Accelerator           Chapter 8. Structbook         Frequency response, Strain ggag, Load cell, Accelerator           Chapter 7. Fundamentals of Dynamic Measurement         Frequency respo	Time of starting a courseSpring1 termFacultyGraduate ProgramDepartment OfferedMechanical EngineeCharge teacher name[Roman alphabet mark]Rec_MAS53025NumberingMEC_MAS53025Objectives of classTo understand mechanical performances or mechanics of solid and structure is lecture design of mechanical structures is explainedContents of classChapter 1. IntroductionChapter 2. Automobile Structures from ViewPurpose of automobile structure, Loading to Deformation of automobile structure, PerformChapter 3. Fundamentals of Structural Mech.Fundamental equations in solid mechanicsChapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of StructureTorsion and bending of thin-walled beamsChapter 7. Fundamentals of Dynamic MeasureFrequency response, Strain gage, Load cell, A Chapter 8. SummarySelf Preparation and ReviewRelated subjectsMechanics of Materials, Elasticity, Solid MechNotes for textbookText will be distributed on the web site. TheReference1Book titleAuthorFungReference3Book titleClassAuthorFungReference4Book titleClassAuthorFungChapter 8.Deck 7.Reference3Book titleChapter 9.Chapter 9.Chapter 9.Chapter 9.Chapter 9.Chap		Subject area	Advanced Mechanical Engineering	Required or elective	Elective				
Faculty     Graduate Program for Master's Degree     Subject grade     1~ manual problem Beggining     11~ M1       Department Offered     Mechanical Engineering     Beggining grade     M1       Charge     tagth ADACHI Tadaharu     Beggining grade     M1       Subject     grade     M1       Subject     grade     M1       Charge     tagth ADACHI Tadaharu     grade       Numbering     MEC.MASS3025     M1       Objectives of class     To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental design of mechanical structures is explained in detail     Contents of ofass       Contents of ofass     Contents of ofass     Fundamentals of Structure     Parpose of automobile structure.       Chapter 1. Introduction     Chapter 2. Automobile Structures from View of Solid Mechanics     Purpose of automobile structure.     Purpose of automobile structure.       Deformation of automobile structure.     Performance of automobile structure     Purpose of automobile structure.     Purpose of automobile structure.       Normal force, shear force, bending moment, torsional moment     Chapter 3. Elementary Mechanics of Structures     Fundamental of Structures       Torsion and bending of thinWalled Structures     Structures     Fundamental of Dynamic Measurement       Frequency response. Strain ggae. Load cell, Accelerator     Chapter 4. Kautonics     MEN <th>Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge       teacher         name[Roman       alphabet mark]         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mech.         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, t         Chapter 5. Elementary Mechanics of Structur         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, A         Chapter 8. Summary         Self Preparation and Review         Reference1       Book title       A Fire         Reference2       Book title       A Fire         Reference3       Book title       Mecharical from Craw         Reference4       Book title       Nerdense</th> <th></th> <th>Day of the week.period</th> <th>Tue.2~2</th> <th>Credit(s)</th> <th>1</th>	Faculty       Graduate Program         Department Offered       Mechanical Enginee         Charge       teacher         name[Roman       alphabet mark]         Numbering       MEC_MAS53025         Objectives of class       To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class       Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mech.         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, t         Chapter 5. Elementary Mechanics of Structur         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, A         Chapter 8. Summary         Self Preparation and Review         Reference1       Book title       A Fire         Reference2       Book title       A Fire         Reference3       Book title       Mecharical from Craw         Reference4       Book title       Nerdense		Day of the week.period	Tue.2~2	Credit(s)	1				
Department Offered         Mechanical Engineering         Beggining grade         M1           Charge nameRoman siphabat mark1         R±: 忠晴 ADACHI Tadaharu         Beggining grade         M1           Objectives of class         MEC_MAS53025         Mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structure is lectured. Especially, mechanics of thin-walled structures which is useful for practical design of mechanical structures is explained in detail.         Contents of class           Contents of class         Contents of class         Formation of automobile structure. Loading to automobile structure           Ohapter 1. Introduction         Chapter 2. Automobile Structure, Performance of automobile structure         Deformation of automobile structure. Performance of automobile structure           Ohapter 3. Fundamental equations in solid mechanics         Fundamental equations in solid mechanics         Fundamental equations of Structures           Chapter 4. Forces and Moments Applying to Structures         Chapter 5. Elementary Mechanics of Structures         Chapter 6. Nearhis of Thin-Walled Structures           Torsion and bending of thin-walled beams         Chapter 6. Nearhis of Thin-Walled Structures         Forapter 7. Fundamentals of Dynamic Measurement           Frequency response, Strain gage, Load cell, Accelerator         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator           Chapter 8. Summary         Sol	Department Offered         Mechanical Enginee           Charge teacher name[Roman alphabet mark]         足立 忠晴 ADACH           Numbering         MEC_MAS53025           Objectives of class         To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained           Contents of class         Chapter 1. Introduction           Chapter 2. Automobile Structures from View           Purpose of automobile structure, Loading to Deformation of automobile structure, Perform           Chapter 3. Fundamentals of Structural Mecha- Fundamental equations in solid mechanics           Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, th Chapter 5. Elementary Mechanics of Structurant Torsion and bending of thin-walled beams           Chapter 7. Fundamentals of Dynamic Measur Frequency response, Strain gage, Load cell, A Chapter 8. Summary           Self Preparation and Review           Related subjects Mechanics of Materials, Elasticity, Solid Mech Notes for textbook           Text will be distributed on the web site. The Reference1           Book title         Mech Author           Reference2         Book title           Reference3         Book title           Reference4         Book title	Graduate Program for Master's Degree Subject 1~								
Charge         teacher name[Roman alphabet mark]         展立 悲講 ADACHI Tadaharu           Numbering         MEC_MASS3025           Objectives of class         To understand mechanical performances of structures, and mechanical behaviors of solid and structures is explained in detail.           Contents of class         Contents of class           Chapter 1. Introduction         Chapter 2. Automobile structure, Leading to automobile structure           Chapter 2. Automobile structure, Derformance of automobile structure         Chapter 3. Fundamentals of Structural Mechanics           Fundamentals of Structural Mechanics         Fundamentals of Structural Mechanics           Fundamentals of Structural Mechanics         Fundamentals of Structural Mechanics           Fundamentals of Structures         Structures           Normal force, shear force, bending moment, torsional moment         Chapter 3. Fundamentals of Structures           Torsion and bending of thin-walled beams         Chapter 4. Forces and Moments Applying to Structures           Torsion and bending of thin-walled beams         Chapter 5. Elementary Mechanics of Structures           Torsion and bending of thin-walled beams         Chapter 6. Structures           Chapter 7. Indimentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator           Chapter 8. Summary         Self Proparation and Review           Related subjects         Matcher Fung YC	Charge teacher name[Roman alphabet mark]         足立 忠晴 ADACH           Numbering         MEC_MAS53025           Objectives of class         To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained           Contents of class         Chapter 1. Introduction           Chapter 2. Automobile Structures from View           Purpose of automobile structure, Loading to Deformation of automobile structure, Perform           Chapter 3. Fundamentals of Structural Mecha-Fundamental equations in solid mechanics           Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of Structural Torsion and bending of thin-walled beams           Chapter 7. Fundamentals of Dynamic Measur           Frequency response, Strain gage, Load cell, A Chapter 8. Summary           Self Preparation and Review           Related subjects           Mechanics of Materials, Elasticity, Solid Mech           Notes for textbook           Text will be distributed on the web site. The Reference1           Book title         Mechanics Graw           Reference3         Book title         Mechanics and the class           Author         Fung           Text will be distributed on the web site. The Reference4         Book title         Mechanics and bending of thin and the class	ring			Beggining	M1				
Importance         MEC_MASS3025           Objectives of class         To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structures is explained in detail.           Contents of class         Contents of class           Chapter 1. Introduction         Chapter 1. Automobile structure, Loading to automobile structure           Deformation of automobile structure, Loading to automobile structure         Deformation of automobile structure is explained in detail.           Chapter 3. Fundamentals of Structural Mechanics         Fundamental equations in solid mechanics is           Chapter 4. Forces and Moments Applying to Structures         Oragin and bending of thin-walled beams           Chapter 5. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams           Chapter 7. Fundamentals of Dynamic Measurement         Contents of class.           Chapter 7. Fundamentals, Elasticity. Solid Mechanics         Structures           Self Preparation and Review         Self Preparation and Review           Reference1         Book title         A First Course in Continuum Mechanics         ISBN           Au	Numbering         MEC_MAS53025           Objectives of class         To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained           Contents of class         Chapter 1. Introduction           Chapter 2. Automobile Structures from View           Purpose of automobile structure, Loading to Deformation of automobile structure, Perform           Chapter 3. Fundamentals of Structural Mecha-           Fundamental equations in solid mechanics           Chapter 4. Forces and Moments Applying to Normal force, shear force, bending moment, the Chapter 5. Elementary Mechanics of Structural Torsion and bending of thin-walled beams           Chapter 7. Fundamentals of Dynamic Measur           Frequency response, Strain gage, Load cell, A Chapter 8. Summary           Self Preparation and Review           Related subjects           Mechanics of Materials, Elasticity, Solid Mechanics of Materials, Elasticity, Solid Mechanics of Author           Reference1         Book title         Mechanics           Reference2         Book title         Mechanics           Reference3         Book title         Mechanics           Reference4         Book title         The craw	足立 忠晴 ADACHI Tadaharu								
Objectives of class           To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structure is lectured. Especially, mechanics of thin-walled structures which is useful for practical design of mechanical structures is explained in detail.           Contents of class         Contents of class           Chapter 1. Introduction         Contents of automobile Structure, Loading to automobile structure           Deformation of automobile structure, Loading to automobile structure         Contents of automobile structure, coading to automobile structure           Deformation of automobile structure, Performance of automobile structure         Chapter 3. Fundamentals of Structural Mechanics           Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Structures           Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures           Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement           Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary           Solf Preparation and Review         ISBN           Related subjects         Mechanics of the text will given in the first class.           Reference1         Book title         A First Course in Continuum Mechanics         ISBN           Reference2         Book title         Mechanics of Engineering Materials <t< th=""><th>Objectives of class         To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class         Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mecha         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, t         Chapter 5. Elementary Mechanics of Structure         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, <i>A</i>         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Book title       Mechanic         Reference3       Book title         Reference4       Book title</th><th></th><th></th><th></th><th></th><th></th></t<>	Objectives of class         To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class         Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mecha         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, t         Chapter 5. Elementary Mechanics of Structure         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, <i>A</i> Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Book title       Mechanic         Reference3       Book title         Reference4       Book title									
To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structure is lectured. Especially, mechanics of thin-walled structures which is useful for practical design of mechanical structures is explained in detail.           Contents of class         Chapter 1. Introduction           Chapter 1. Introduction         Chapter 2. Automobile Structure, Loading to automobile structure           Deformation of automobile structure, Derformance of automobile structure         Deformation of automobile structure, Performance of automobile structure           Chapter 3. Fundamentals of Structural Mechanics         Fundamental equations in solid mechanics           Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment           Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams           Chapter 6. Mechanics of Structures         Chapter 7. Fundamentals of Dynamic Measurement           Frequency response, Strain gage, Load cell, Accelerator         Chapter 7. Fundamentals of Dynamic Measurement           Frequency response, Strain gage, Load cell, Accelerator         Structures           Chapter 7. Summary         Solid Mechanics           Self Progaration and Review         ISBN           Text will be distributed on the web site. The details of the text will given in the first class.         ISBN           Reference1         Book title         A First Cour	To understand mechanical performances of mechanics of solid and structure is lecture design of mechanical structures is explained         Contents of class         Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, th         Chapter 5. Elementary Mechanics of Structural         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Book title       Mechanic         Reference3       Book title       Mechanic         Reference4       Book title       The									
Contents of class         Chapter 1. Introduction         Chapter 2. Automobile Structures from View of Solid Mechanics         Purpose of automobile structure, Loading to automobile structure         Deformation of automobile structure, Performance of automobile structure         Chapter 3. Fundamentals of Structural Mechanics         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage. Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Reference1       Book title         Acthor       Fung YC         Publisher       Prentice-Hall         Publisher       Prentice-Hall         Publish year       IsBN         Author       Fung YC       Publisher         Reference3       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics<	Contents of class         Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to         Deformation of automobile structure, Perforr         Chapter 3. Fundamentals of Structural Mech.         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, t         Chapter 5. Elementary Mechanics of Structural         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Meck         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fing         Reference3       Book title       Mechanics         Reference4       Book title       Class         Author       Fung         T       T       T	of structures, d. Especially, in detail.	and mechanical mechanics of thi	behaviors of solid in-walled structures	and structures which is usefu	, fundamental I for practical				
Chapter 1. Introduction         Chapter 2. Automobile Structures from View of Solid Mechanics         Purpose of automobile structure, Loading to automobile structure         Deformation of automobile structure, Performance of automobile structure         Chapter 3. Fundamentals of Structural Mechanics         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN	Chapter 1. Introduction         Chapter 2. Automobile Structures from View         Purpose of automobile structure, Loading to         Deformation of automobile structure, Perform         Chapter 3. Fundamentals of Structural Mech         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, it         Chapter 5. Elementary Mechanics of Structur         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structur         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference2       Book title       A Fing         Reference3       Book title       Mech         Reference4       Book title       Class         Author       Fung         T       T									
Deformation of automobile structure, Performance of automobile structure Chapter 3. Fundamentals of Structural Mechanics Fundamental equations in solid mechanics Chapter 4. Forces and Moments Applying to Structures Normal force, shear force, bending moment, torsional moment Chapter 5. Elementary Mechanics of Structures Torsion and bending of thin-walled beams Chapter 6. Mechanics of Thin-Walled Structures Torsion and bending of thin-walled beams Chapter 7. Fundamentals of Dynamic Measurement Frequency response, Strain gage, Load cell, Accelerator Chapter 8. Summary Self Preparation and Review Related subjects Mechanics of Materials, Elasticity, Solid Mechanics Notes for textbook Text will be distributed on the web site. The details of the text will given in the first class. Reference1 Book title A First Course in Continuum Mechanics ISBN Author Fung YC Publisher Prentice-Hall Publish year Reference2 Book title Mechanics of Engineering Materials Author Benham PP, Publisher Longman Publish year Crawford RJ and Armstrong CG Reference3 Book title Classical and Computational Solid Mechanics ISBN 2001 T	Deformation of automobile structure, Perforr         Chapter 3. Fundamentals of Structural Mech         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, it         Chapter 5. Elementary Mechanics of Structur         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structur         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fing         Reference3       Book title       Class         Author       Fung         Reference4       Book title       Class         Author       Fung         T       To show title       To show title	of Solid Mecha	anics ucture							
Chapter 3. Fundamentals of Structural Mechanics         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title         Author       Fung YC       Publisher         Prentice-Hall       Publish year         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Author       Benham PP, Crawford RJ and Armstrong CG       Publisher       Longman       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN       2001         T       T       Publis	Chapter 3. Fundamentals of Structural Mech         Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, it         Chapter 5. Elementary Mechanics of Structur         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structur         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference3       Book title         Reference4       Book title         Nuthor       Fung         T       Reference4	nance of autor	nobile structure							
Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title         A First Course in Continuum Mechanics       ISBN         Author       Fung YC         Publisher       Prentice-Hall         Publish year       Crawford RJ and Armstrong CG         Author       Benham       PP, Orarwing Materials         Reference3       Book title       Classical and Computational Solid Mechanics         Reference3       Book title       Classical and Computational Solid Mechanics         Image: Chapter 7       Fung YC and Pin       Publisher	Fundamental equations in solid mechanics         Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, 4         Chapter 5. Elementary Mechanics of Structu         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Proparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fir         Author       Fung         Reference3       Book title       Class         Author       Fung         T       T       T         Reference4       Book title       Vol.7	anics								
Chapter 4. Forces and Moments Applying to Structures         Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Author       Fung YC a	Chapter 4. Forces and Moments Applying to         Normal force, shear force, bending moment, 1         Chapter 5. Elementary Mechanics of Structu         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference3       Book title         Reference4       Book title         Class       Author									
Normal force, shear force, bending moment, torsional moment         Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title         A First Course in Continuum Mechanics       ISBN         Reference2       Book title         Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Author       Fung YC and Pin       Publisher       World Scientific       Publish year         Reference3       Book title       Classical and Computational Solid Mechani	Normal force, shear force, bending moment, 1         Chapter 5. Elementary Mechanics of Structu         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference2       Book title         Reference3       Book title         Class       Author         Fung       T         Reference4       Book title	Structures								
Chapter 5. Elementary Mechanics of Structures         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title         Author       Fung YC         Publisher       Prentice-Hall         Publisher       ISBN         Reference2       Book title         Muthor       Fung YC         Publisher       Longman         Publish year       Crawford RJ and Armstrong CG         Reference3       Book title       Classical and Computational Solid Mechanics         Reference3       Book title       Classical and Computational Solid Mechanics         Reference3       Book title       Classical and Computational Solid Mechanics         To       To       Vorld Scientific       Publish year         Problemer       Fu	Chapter 5. Elementary Mechanics of Structu         Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mech         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fir         Author       Fung         Reference3       Book title       Mecharis         Reference4       Book title       Class         Author       Fung       T         Author       Fung       T	orsional mome	ent							
Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structures         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN	Torsion and bending of thin-walled beams         Chapter 6. Mechanics of Thin-Walled Structu         Torsion and bending of thin-walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Meel         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference3       Book title         Reference4       Book title         Class       Author         Fung       T         Reference4       Book title	res								
Chapter 6. Mechanics of 1 hin-Walled Structures Torsion and bending of thin-walled beams Chapter 7. Fundamentals of Dynamic Measurement Frequency response, Strain gage, Load cell, Accelerator Chapter 8. Summary Self Preparation and Review Related subjects Mechanics of Materials, Elasticity, Solid Mechanics Notes for textbook Text will be distributed on the web site. The details of the text will given in the first class. Reference1 Book title A First Course in Continuum Mechanics ISBN Reference2 Book title Mechanics of Engineering Materials ISBN Reference3 Book title Classical and Computational Solid Mechanics ISBN 2001 T	Chapter 6. Mechanics of Thin–Walled Structu         Torsion and bending of thin–walled beams         Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fir         Author       Fung         Reference2       Book title       Mechanics         Reference3       Book title       Class         Author       Fung       T         Reference4       Book title       Theor									
Chapter 7. Fundamentals of Dynamic Measurement         Frequency response, Strain gage, Load cell, Accelerator         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Zolid       T       T       Solid Scientific       Publish year	Chapter 7. Fundamentals of Dynamic Measur         Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mecl         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference2       Book title         Reference3       Book title         Class       Author         Fung       T         Reference4       Book title	res								
Origination and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1         Book title       A First Course in Continuum Mechanics         Reference2       Book title       Mechanics of Engineering Materials         Reference3       Book title       Classical and Computational Solid Mechanics	Frequency response, Strain gage, Load cell, /         Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mecl         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference2       Book title         Reference3       Book title         Class       Author         Fung       T         Reference4       Book title	amont								
Chapter 8. Summary         Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title         Author       Fung YC         Publisher       Prentice-Hall         Publish year         Reference2       Book title         Mechanics of RJ and Author       Benham PP, Crawford RJ and Armstrong CG         Reference3       Book title         Classical and Computational Solid Mechanics       ISBN         Author       Fung YC and Pin T         Publisher       World Scientific         Publish year       2001	Related subjects       Mechanics of Materials, Elasticity, Solid Mechanics       Notes for textbook       Text will be distributed on the web site. The       Reference1     Book title       Author     Fung       Reference2     Book title       Reference3     Book title       Class     Author       Fung     T       Reference4     Book title	Accelerator								
Solid Proparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials         ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Author       Fung YC and Pin       Publisher       World Scientific       Publish year       2001	Self Preparation and Review         Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title         Author       Fung         Reference2       Book title         Reference3       Book title         Craw       Author         T       Reference4         Book title       Fung         T       Author         Fung       T									
Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       Prentice-Hall       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Author       Fung YC and Pin T       Publisher       Longman       Publish year         Image: Classical and Computational Solid Mechanics       ISBN       Image: Classical and Computational Solid Mechanics       Image: Classical and	Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fir         Author       Fung         Reference2       Book title       Mechanics         Reference3       Book title       Class         Reference4       Book title       Class         Author       Fung       T         Reference4       Book title       Vol.7									
Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       Prentice-Hall       Publish year         Reference3       Book title       Mechanics of Engineering Materials       Longman       Publish year         Reference3       Book title       Crawford RJ and Armstrong CG       Longman       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       T       Fung YC and Pin T       World Scientific       Publish year       2001	Related subjects         Mechanics of Materials, Elasticity, Solid Mechanics of Materials, Elasticity, Solid Mechanics of Materials, Elasticity, Solid Mechanics, Solid Mechani									
Mechanics of Materials, Elasticity, Solid Mechanics         Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.       ISBN         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       Prentice-Hall       Publish year         Reference3       Book title       Benham       PP, Crawford RJ and Armstrong CG       Publisher       Longman       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN       2001	Mechanics of Materials, Elasticity, Solid Mecl       Notes for textbook       Text will be distributed on the web site. The       Reference1     Book title     A Fir       Author     Fung       Reference2     Book title     Mecl       Author     Benh Craw Arms       Reference3     Book title     Class       Reference4     Book title     T									
Notes for textbook         Text will be distributed on the web site. The details of the text will given in the first class.         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Author       Fung YC       Publisher       Prentice-Hall       Publish year         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Author       Benham       PP, Crawford RJ and Armstrong CG       Publisher       Longman       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN       2001         Author       Fung YC and Pin T       Publisher       World Scientific       Publish year       2001	Notes for textbook         Text will be distributed on the web site. The         Reference1       Book title       A Fin         Author       Fung         Reference2       Book title       Mecl         Author       Benh       Craw         Reference3       Book title       Class         Reference4       Book title       The Class         Author       Fung         Author       Fung         Author       Fung         Craw       Author       Fung         Reference3       Book title       Class         Author       Fung       The Class <th>nanics</th> <th></th> <th></th> <th></th> <th></th>	nanics								
Book title       A First Course in Continuum Mechanics       ISBN         Reference1       Book title       A First Course in Continuum Mechanics       ISBN         Reference2       Book title       Mechanics of Engineering Materials       Prentice-Hall       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Image: The details of the text will given in the first class.       Image: The details of the text will given in the first class.       Image: The details of the text will given in the first class.         Reference2       Book title       Mechanics of Engineering Materials       Image: The details of the text will given in the first class.       Image: The details of the text will given in the first class.         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Image: The details of the text will given in the first class.       Image: The details of the text will given in the first class.       Image: The details of the text will given in the first class.         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN         Image: The details of the text will given in the first class.       The details of the text will given in the first class.       Image: The text will given in the text will given in	Reference1     Book title     A Fin       Reference2     Book title     Mecl       Author     Fung       Reference3     Book title     Mecl       Reference4     Book title     Class       Author     Fung       T     Reference4     Book title			<b>C</b>						
Book title       A First Course in Continuum Micchanics       ISBN         Author       Fung YC       Publisher       Prentice-Hall       Publish year         Reference2       Book title       Mechanics of Engineering Materials       ISBN         Author       Benham       PP, Crawford RJ and Armstrong CG       Publisher       Longman       Publish year         Reference3       Book title       Classical and Computational Solid Mechanics       ISBN       2001         T       Publisher       World Scientific       Publish year       2001	Book title     A Fill       Author     Fung       Reference2     Book title     Mecl       Author     Benh Craw Arms       Reference3     Book title     Class       Author     Fung       T     Reference4     Book title     Theory       Author     Fung       T     Author     Fung       Author     Fung       Author     Fung       Author     Fung       T     Author     Fung       T     Author     Fung	uecalls of the t	Lext will given in th	ie ilrst class.	ICDN					
Reference3     Book title     Mechanics of Engineering Materials     Longman     Publish year       Reference3     Book title     Classical and Computational Solid Mechanics     ISBN	Author     Fung       Reference2     Book title     Mecl       Author     Benh Craw Arms       Reference3     Book title     Class       Author     Fung       T     Reference4     Book title     Theory       Author     Fung       Author     Fung       Author     Fung       Class     Author     Fung       Author     Fung       T     Reference4     Book title									
Book title     Mechanics of Engineering Materials     ISBN       Author     Benham     PP, Crawford RJ and Armstrong CG     Publisher     Longman     Publish year       Reference3     Book title     Classical and Computational Solid Mechanics     ISBN       Author     Fung YC and Pin T     Publisher     World Scientific     Publish year	Reference2     Book title     Mecl       Author     Benh Craw Arms       Reference3     Book title     Class       Author     Fung T       Reference4     Book title     Theory       Author     Loor     Vol.7	YC	Publisher	Prentice-Hall	Publish year					
Author     Benham     PP, Crawford     Publisher     Longman     Publish year       Crawford     RJ     and Armstrong     CG     Publish     Publish       Reference3     Book title     Classical and Computational Solid Mechanics     ISBN       Author     Fung     YC and Pin T     Publisher     World Scientific     Publish year     2001	Author     Benil Craw Arms       Reference3     Book title     Class       Author     Fung T       Reference4     Book title     The control of the contro	Book title Mechanics of Engineering Materials ISBN								
Crawford RJ and Armstrong CG     Sector     Sector       Book title     Classical and Computational Solid Mechanics     ISBN       Author     Fung YC and Pin T     Publisher     World Scientific     Publish year     2001	Reference3     Book title     Class       Author     Fung       T     Reference4     Book title     The constraints	iam PP,	Publisher	Longman	Publish year					
Reference3     Book title     Classical and Computational Solid Mechanics     ISBN       Author     Fung YC and Pin T     Publisher     World Scientific     Publish year     2001	Reference3     Book title     Class       Author     Fung       T     Reference4     Book title     Theory       Author     Look     Vol.7	ford RJ and								
Book title         Classical and Computational Solid Mechanics         ISBN           Author         Fung YC and Pin T         Publisher         World Scientific         Publish year         2001	Reference3     Book title     Clas       Author     Fung T       Reference4     Book title     Theory Vol.7	strong CG		L						
Author         Fung YC and Pin         Publisher         World Scientific         Publish year         2001	Author     Fung T       Reference4     Book title     Theory Vol.7	Book title Classical and Computational Solid Mechanics ISBN								
	Reference4 Book title Theo Vol.7	Author         Fung YC and Pin         Publisher         World Scientific         Publish y           T								
Reference4 Book title Theory of Elasticity, Course of Theoretical Physics ISBN Vol.7	A	ry of Elastic	ity, Course of T	heoretical Physics	ISBN					
Author         Landau         L.D. and         Publisher         Publish year         1970           Lifshitz E.M.	Author Land Lifsh	au L.D. and itz E.M.	Publisher		Publish year	1970				
Reference5         Book title         Aircraft Structures for Engineering Students         ISBN	Reference5 Book title Aircr	aft Structures	for Engineering S	tudents	ISBN					
	Author Meg	on THG	Publisher	Butterworth- Heinemann	Publish year	2007				

Notes for reference
Goals to be achieved
To understand physical meaning fundamental equations in solid mechanics.
To deeply understand elementary mechanics of materials (strength of materials); tension of bar, torsion of axis and bending of
beam.
To understand mechanics of thin-walled structures.
To know concept of dynamic measurement of deformation.
Evaluation of achievement
Examinations, 80 % and attendances, 20 %
Examination
その他
By Report
Details of examination
Other information
Prof Tadaharu Adachi, Room D−305, Extension phone 6664, Email adachi@me.tut.ac.jp
Reference URL
http://solid.me.tut.ac.jp/solid/
Office hours
Anytime. Contact me by email before coming if possible.
Relations to attainment objectives of learning and education
Key words
A Strength of materials. Mechanics of materials, solid mechanics, Structural mechanics, Thin-walled Structure

(M41630080)Science ar	nd Technology	of Thin Films[Science	and Technology	of Thin Films]						
Subject name[English]	Science and	Technology of Thin Fil	ms[Science and <sup>-</sup>	Technology of Thin	Films]					
Schedule number	M41630080		Subject area	Advanced Mechanical Engineering	Required or elective	Elective				
Time of starting a course	Spring2 term	I	Day of the week.period	Fri.2~2	Credit(s)	1				
Faculty	Graduate Pro	Graduate Program for Master's Degree Subject 1~								
Department Offered	Mechanical Engineering Beggining M1 grade M1									
Charge teacher name[Roman alphabet mark]	伊崎 昌伸 IZAKI Masanobu									
Numbering	MEC_MAS54025									
Objectives of class         To understand fundamental thermodynamics and solid state physics of thin film and the applications         Contents of class         1. Introduction to Thin film and preparation         2. Thermodynamics in solution chemical process(I)         3. Thermodynamics in solution chemical process(II)         4. Electronic state in inorganic thin films         5. Crystal structure and symmetry on thin films         6. Structural analysis of thin films         7. Physical properties of thin films         8. Oxide semiconductor thin films and application         Self Preparation and Review         This class deals with the deposition mechanism based on the thermodynamics and the characteristics of structure, optical and electrical properties based on solid state physics.         Related subjects         Basic knowledge of chemistry and solid-state physics										
Reference1	Book title	Modern Electroplatin	ng, 5 th edition		ISBN	978-0-				
	Author     M. schlesinger, M.     Publisher     Weily & Sons     Publish year     201									
Notes for reference										
<b>Goals to be achieved</b> 1. Understanding of the 2. Understanding of the	rmodynamic in basic solid sta	soft-solution processi te physics of thin films	ng							
Reports(50%) and presentation(50%)										
その他 By Report										
Details of examination										
Other information										
Masanobu Izaki, D-505, <b>Reference URL</b>	m−izaki@me.tu	t.ac.jp								
Office hours as-needed	abiaati									
Relations to attainment	ODJECTIVES OF	learning and education								

Key words

thin films, thermodynamics, physics, semiconductor

(M41630130)Modeling	and Analysis	of Dynamical Control Syste	ems[Modeling and	Analysis of Dynar	nical Control Sy	ystems]				
Subject	Subject Modeling and Analysis of Dynamical Control Systems[Modeling and Analysis of Dynamical Control									
name[English]	Systems]		<u>r</u>		T					
Schedule number	M41630130		Subject area	Advanced	Required or	Elective				
				Mechanical	elective					
				Engineering						
Time of starting a	Spring1 tern	n	Day of the	Thu.2~2	Credit(s)	1				
course			week,period							
Faculty	Graduate Pr	rogram for Master's Degree			Subject	1~				
	grade									
Department Offered	Mechanical	Mechanical Engineering Beggining M1								
<b>.</b>	+ 44 +									
Charge teacher	寺嶋 一彦 TERASHIMA Kazuhiko									
name[Roman										
alphabet markj		5005								
Numbering	MEC_MAS5	0020								
Objectives of class										
Basic modelling and a	nalysis of dyn	amical systems is lectured	to conduct syst	ematic control des	ign . First, phys	sical modeling				
are studied. Next, tra	nsfer functio	n and realization are lect	ured. Finally, ide	entification theory	are lectured f	or parameter				
estimation by least sq	uare method a	and determination of model	order by AIC .							
Basic modelling and a	nalysis of dyn	amical systems is lectured	to conduct syst	ematic control des	ign . First, phys	sical modeling				
are studied. Next, tra	inster functio	n and realization are lect	ured. Finally, ide	entification theory	are lectured f	or parameter				
estimation by least sq	uare method a	and determination of model	order by AIC .							
We provide the followi	ng schedule. I	Because this course is for	master students,	we can consider t	he requests fro	m the master				
students.										
1st week: Modelling of	Physical syst	ems								
2nd week: Transfer fu	nction and Re	alization								
3rd week: Identification	n I- Non-para	metric method								
4th week: Identification	n II- Parameti	ric method, Least square m	ethod							
5th week: Persistent E	excitation and	AIC								
6th week: Simulation b	y using Matla	b software								
/th week: Relationship	between Moo	deling and control								
8th week: Test										
We provide the followi	ng schedule. I	Because this course is for	master students,	we can consider t	he requests fro	m the master				
students.										
1st week: Modelling of	Physical syst	ems								
2nd week: Transfer fu	nction and Re	alization								
3rd week: Identification	n I- Non-para	metric method								
4th week: Identification	n II- Parameti	ric method, Least square m	ethod							
oth week: Persistent E	Excitation and									
oth week: Simulation b	by using Matia	D SOTTWARE								
7th week: Relationship between Modeling and control										
our week. Test										
	<b>.</b> .									
Self Preparation and I	<b>Keview</b>									
Related subjects										
Fundamentals of linear	r algebra, diffe	erential equation, mechanics	s, measurement a	nd control theory, a	and robotics.					
Fundamentals of linear	r algebra, diffe	erential equation, mechanics	s, measurement a	nd control theory, a	and robotics.					
Notes for textbook										
Reference1	Book title	Linear Feedback Control	- Analysis and D	esign with Matlab	ISBN	978-0-				
						898716-				
						38-2				
	Author	D.Xue, Y.	Publisher	Siam	Publish	2007				
		Q.Chen,D.P.Ttherton			year					

#### Notes for reference

#### Goals to be achieved

(1) Understand	Analysis methods of Dynamical Systems
(2) Understand	Modeling
(3) Understand	Identification
(4) Understand	Least square method
(5) Understand	PE condition and AIC
(6) Understand	Realization
(1) Understand	Analysis methods of Dynamical Systems
(2) Understand	Modeling
(3) Understand	Identification
(4) Understand	Least square method
(5) Understand	PE condition and AIC

#### **Evaluation of achievement**

Other information
Details of examination
Examination(Face to Face)
定期試験を実施(対面)
Examination
C:Score of the report is 60 or higher.
B:Score of the report is 70 or higher.
A:Score of the report is 80 or higher.
S: Score of the report is 90 or higher.
Test(70%) Report (30%)
C:Score of the report is 60 or higher.
B:Score of the report is 70 or higher.
A:Score of the report is 80 or higher.
S: Score of the report is 90 or higher.
Test(70%) Report (30%)

#### Outer information

Tel. 0532-44-6699 E-mail:terasima@me.tut.ac.jp

Tel. 0532-44-6699 E-mail:terasima@me.tut.ac.jp

#### Reference URL

Students who are interesting with dynamical systems, modeling, identification and control design such as Nonlinear optimal control, Linear optimal control, Observer, Kalman filter and H-infinity robust control are very welcome.

Basic control theory and mathematical knowledge are required.

Students who are interesting with dynamical systems, modeling, identification and control design such as Nonlinear optimal control, Linear optimal control, Observer , Kalman filter and H-infinity robust control are very welcome.

Basic control theory and mathematical knowledge are required.

#### Office hours

Thursday 4-6pm (Terashima D-510)

Thursday 4-6pm (Terashima D-510)

#### Relations to attainment objectives of learning and education

(D1) Ability for solving problems with expertise

(D1) Ability for solving problems with expertise

#### Key words

Modeling, Identification, Realization, Control Modeling, Identification, Realization, Control

#### (M41630220)Advanced Mechanical Systems Design II[Advanced Mechanical Systems Design II]

Subject name[English]	Advanced Mechar	nical Systems Desig	n II[Advanced Med	chanical Systems De	sign II]			
Schedule number	M41630220	Subject area	Advanced	Required or	Elective			
			Mechanical	elective				
			Engineering					
Time of starting a course	Spring term	Day of the week,period	Mon.4~4	Credit(s)	2			
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	1~			
Department Offered	Mechanical Engine	eering		Beggining grade	M1			
Charge teacher name[Roman	S1系教務委員 1	kei kyomu Iin−S						
alphabet mark]								
Numbering	MEC_MAS63025							
Objectives of class								
This lecture aims to provide a br	oad understanding	of the mechanical s	ystems design ava	ailable for the maste	r thesis research			
work of a student.								
Contents of class								
The class provides both of funda	amental knowledge	of his/her master t	hesis research wo	ork and the most ad	vanced results in			
the related field by reading rese	earch papers and n	nonographs. The co	ontents of the cla	ss depend on the s	upervisor. To be			
announced by individual supervise	ors.							
Self Preparation and Review								
Related subjects								
Notes for textbook								
Textbook or material will be made	e available from the	supervisors.						
Notes for reference								
Goals to be achieved								
To acquire fundamental knowledge of individual research fields.								
To acquire the ability to find prob	lems, the ability to	solve the problems	and the presentat	ion skill.				
Evaluation of achievement								
Coursework, presentation and/or <b>Examination</b>	report.							
None during exam period								
Details of examination								
Other information								
Reference URL								
Office hours								
Relations to attainment objective	es of learning and e	ducation						
Key words								

Subject name[English]	Advanced Materials and Manufacturing Process II[Advanced Materials and Manufacturing Process II]							
Schedule number	M41630240 Subject area A		M41630240 Subject area Advanced Mechanical					
				Engineering	ng			
Time of starting a course	Spring term Day of the Tue.4~4 week,period				Credit(s)	2		
Faculty	Graduate Progr	am for Mast	er's Degr	ee	Subject grade	1~		
Department Offered	Mechanical Engineering Beggining M1 grade							
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S							
Numbering	MEC_MAS54025	5						
research work of a student. Contents of class The class provides both of fund- the related field by reading rese approximated by individual supports	amental knowledg earch papers and	e of his/her monograph	master t s. The co	hesis research w ontents of the cla	ork and the most ad ass depend on the s	vanced resupervisor.		
Self Preparation and Review	ors.							
Related subjects								
<b>Goals to be achieved</b> To acquire fundamental knowledg To acquire the ability to find prot	e of individual res plems, the ability t	earch fields o solve the	problems	and the presenta	tion skill.			
Evaluation of achievement								
Coursework, presentation and/or	report.							
Framination	F							
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         Reference URL								
None during exam period         Details of examination         Other information         Reference URL         Office hours								
None during exam period Details of examination Other information Reference URL Office hours Relations to attainment objective	os of learning and	education						
None during exam period Details of examination Other information Reference URL Office hours Relations to attainment objective	es of learning and	education						

#### (M41630260)Advanced System, Control and Robotics II[Advanced System, Control and Robotics II]

Subject name[English]	Advanced System	n. Control and Robo	tics II[Advanced Sv	vstem. Control and I	Robotics II]		
Schedule number	M41630260	Subject area	Advanced	Required or	Elective		
			Mechanical	elective			
			Engineering				
Time of starting a course	Spring term	Day of the week.period	Thu.4~4	Credit(s)	2		
Faculty	Graduate Progran	n for Master's Degre	ee	Subject grade	1~		
Department Offered	Mechanical Engine	eering		Beggining	M1		
	_	-		grade			
Charge teacher name[Roman	S1系教務委員 1	kei kyomu Iin−S					
alphabet mark]							
Numbering	MEC_MAS55025						
Objectives of class							
This lecture aims to provide a bro	oad understanding o	of the control and ro	botics available fo	or the master thesis	research work of		
a student.							
Contents of class							
The class provides both of funda	amental knowledge	of his/her master t	hesis research wo	ork and the most ad	vanced results in		
the related field by reading rese	arch papers and n	nonographs. The co	ontents of the clas	ss depend on the s	supervisor. To be		
announced by individual supervise	ors.						
Self Preparation and Review							
Related subjects							
Notes for textbook							
Textbook or material will be made	available from the	supervisors.					
Notes for reference							
Goals to be achieved							
To acquire fundamental knowledge of individual research fields.							
To acquire the ability to find prob	lems, the ability to	solve the problems	and the presentati	ion skill.			
Evaluation of achievement							
Coursework, presentation and/or	report.						
Examination							
None during exam period							
Details of examination							
Other information							
Reference URL							
Office hours							
Relations to attainment objectives of learning and education							
הסומנוסווז נט מננמוווווסור טטוסכנועפ	o vi loarning allu o	uvadvii					
× .							
Key words							

	Advanced Energy	gy and Environment	al Engineering II[	Advanced Energy ar	nd Enviro		
Schedule number	M41630280	Subject area	Advanced Mechanical	Required or elective	Elective		
Time of starting a course	Spring term	Day of the	Engineering Fri.4~4	Credit(s)	2		
Faculty	Graduate Progra	meek,period	ee	Subject grade	1~		
Department Offered	Mechanical Engineering M1 grade						
Charge teacher name[Roman alphabet mark]	S1系教務委員	1kei kyomu Iin−S					
Numbering	MEC_MAS56025						
research work of a student. Contents of class The class provides both of fund	amental knowledge	e of his/her master t	thesis research w	ork and the most ad	vanced re		
the related field by reading rese	earch papers and	monographs. The co	ontents of the cl	ass depend on the s	supervisor		
announced by individual supervise	ors.						
Sen Preparation and Review							
Delete di coltra di							
Related subjects							
Notes for textbook Textbook or material will be made	e available from th	e supervisors.					
Notes for reference							
Goals to be achieved							
To acquire fundamental knowledg To acquire the ability to find prob	e of individual reso plems, the ability to	earch fields. o solve the problems	and the presenta	tion skill.			
Evaluation of achievement							
Evaluation of achievement	report						
Evaluation of achievement Coursework, presentation and/or Examination	report.						
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination	report.						
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination Other information	report.						
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination Other information Reference URL	report.						
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination Other information Reference URL Office hours	report.						
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination Other information Reference URL Office hours Relations to attainment objective	ereport.	education					
Evaluation of achievement Coursework, presentation and/or Examination None during exam period Details of examination Other information Reference URL Office hours Relations to attainment objective	es of learning and o	education					

	and Beergh er Bynamieal eenaler eyesen	erueaeuu8 aua			
Subject	Modeling and Design of Dynamical (	Control Systems	s[Modeling and D	esign of Dyna	nical Control
Indine[Linghan]	Oystellis			1	
Schedule number	M41630420	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a	Spring term	Day of the	Thu.2~2	Credit(s)	2
course		week,period			
Faculty	Graduate Program for Master's Degree			Subject grade	2~2
Department Offered	Mechanical Engineering			Beggining grade	M2
Charge teacher name[Roman alphabet mark]	寺嶋 一彦 TERASHIMA Kazuhiko				
Numbering	MEC_MAS55025				

#### (M41630420)Modeling and Design of Dynamical Control Systems[Modeling and Design of Dynamical Control Systems]

#### **Objectives of class**

Basic modelling and analysis of dynamical systems is lectured to conduct systematic control design . First, physical modeling, realization and identification theory are lectured to realize time-domain computer simulation. Next, control design theory is lectured. Nonlinear optimal control is studied by using calculus of variation. Then, based on this result, Linear Optimal (LQ) control is studied, and Observer and Kalman filter are lectured. Finally, H-infinity robust control is lectured. Several examples and application are introduced.

Some applications such at vibration control, transfer control and stabilization problem are introduced.

Basic modelling and analysis of dynamical systems is lectured to conduct systematic control design . First, physical modeling, realization and identification theory are lectured to realize time-domain computer simulation. Next, control design theory is lectured. Nonlinear optimal control is studied by using calculus of variation. Then, based on this result, Linear Optimal (LQ) control is studied, and Observer and Kalman filter are lectured. Finally, H-infinity robust control is lectured. Several examples and application are introduced.

Some applications such at vibration control, transfer control and stabilization problem are introduced.

#### **Contents of class**

We provide the following schedule. Because this course is for master students, we can consider the requests from the master students.

1st week: Modelling

2nd week: Transfer function and Realization

3rd week: Identification I- Non-parametric method

4th week: Identification II- Parametric method, Least square method

5th week: Persistent Excitation and AIC

6th week: Discrete system

7th week: Transformation from discrete system to continuous system and vice versa

8th week: Nonlinear optimal control by using calculus variation

9th week: Application to Linear system, and Linear optimal control(LQ)

10th week: Observer

11th week: Kalman filter

12th week: Introduction of H-infinity control

13th week: Mixed sensitivity problem

14th week: Generalized plant and Solution

15th week: Examples and application

16th weeks: Test

We provide the following schedule. Because this course is for master students, we can consider the requests from the master students.

1st week: Modelling 2nd week: Transfer function and Realization 3rd week: Identification I- Non-parametric method 4th week: Identification II- Parametric method, Least square method 5th week: Persistent Excitation and AIC 6th week: Discrete system 7th week: Transformation from discrete system to continuous system and vice versa 8th week: Nonlinear optimal control by using calculus variation 9th week: Application to Linear system, and Linear optimal control(LQ) 10th week: Observer 11th week: Kalman filter 12th week: Introduction of H-infinity control 13th week: Mixed sensitivity problem 14th week: Generalized plant and Solution

15th week: Examples and application

16th weeks: Test

#### Self Preparation and Review

#### **Related** subjects

Fundamentals of linear algebra, differential equation, mechanics, measurement and control theory, and robotics. Fundamentals of linear algebra, differential equation, mechanics, measurement and control theory, and robotics. **Notes for textbook** 

Reference1	Book title	Linear Feedback Cor	Linear Feedback Control - Analysis and Design with Matlab					
				898716-				
	Author	D.Xue,	Υ.	Publisher	Siam	Publish	2007	
		Q.Chen,D.P.Ttherton				year		
Notes for reference								

#### Goals to be achieved

Goals to be achieved
(1) Understand Analysis methods of Dynamical Systems
(2) Understand Modeling
(3) Understand Identification
(4) Understand Least square method
(5) Understand PE condition and AIC
(6) Understand Realization
(7) Understand Discrete system and continuous system
(8) Understand Nonlinear optimal control
(9) Understand Liner optimal control
(10) Understand Observer and Kalman filter
(11) Understand H-infinity robust control
(1) Understand Analysis methods of Dynamical Systems
(2) Understand Modeling
(3) Understand Identification
(4) Understand Least square method
(5) Understand PE condition and AIC
(6) Understand Realization
(7) Understand Discrete system and continuous system
(8) Understand Nonlinear optimal control
(9) Understand Liner optimal control
(10) Understand Observer and Kalman filter
(11) Understand H-infinity robust control
Evaluation of achievement
Test(70%) Report (30%)
S: Score of the report is 90 or higher.
A:Score of the report is 80 or higher.
B:Score of the report is 70 or higher.
C:Score of the report is 60 or higher.
Test(70%) Report (30%)
S: Score of the report is 90 or higher.
A:Score of the report is 80 or higher.
B:Score of the report is 70 or higher.
C: Score of the report is 60 or higher.
定期試験を実施(対面)
Examination(Face to Face)

#### Details of examination

#### Other information

Tel. 0532-44-6699 E-mail:terasima@me.tut.ac.jp Tel. 0532-44-6699

E-mail:terasima@me.tut.ac.jp

#### **Reference URL**

Students who are interesting with dynamical systems, modeling, identification and control design such as Nonlinear optimal control, Linear optimal control, Observer , Kalman filter and H-infinity robust control are very welcome.

Basic control theory and mathematical knowledge are required.

Students who are interesting with dynamical systems, modeling, identification and control design such as Nonlinear optimal control, Linear optimal control, Observer, Kalman filter and H-infinity robust control are very welcome.

Basic control theory and mathematical knowledge are required.

#### Office hours

Thursday 4–6pm (Terashima D–510)

Thursday 4-6pm (Terashima D-510)

#### Relations to attainment objectives of learning and education

(D1) Ability for solving problems with expertise

(D1) Ability for solving problems with expertise

#### Key words

Modeling, Identification, Realization, Optimal control, Obserbver and Kalman filter, H-infinity control, Robust control Modeling, Identification, Realization, Optimal control, Obserbver and Kalman filter, H-infinity control, Robust control

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on						
	Electrical and Electronic Information Engineering]						
Schedule number	M42610020	Subject area	Advanced	Required or	Required		
			Electrical and	elective			
			Electronic				
			Engineering				
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6		
		week,period			-		
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~		
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining grade	M1, M2		
Charge teacher name[Roman	S2系教務委員, 2	2系各教員 2kei kyor	mu Iin−S, 2kei kakuk	youin			
alphabet mark]							
Numbering							
Objectives of class							
The thesis research aims to prov	vide a practical exp	perience of research	n work, and to acqu	ire his/her researd	ch skill with deep		
understanding of the electrical an	d electronic inform	ation engineering.					
Contents of class							
The research subject depends or	n the supervisor an	nd the research gro	up you belong to. E	very student will h	nave an individual		
research subject. For more detail	s, please contact w	ith your supervisor.					
Sen Preparation and Review							
Related subjects							
Notes for textbook							
Reference and material will be av	ailable from the sup	bervisor.					
Notes for reference							
Goola to be aphiaved							
To get comething new on individu	al recearch fields						
To develop his/her research skill	including the planni	ing and the presents	ation				
Evaluation of achievement							
Presentation. Thesis. Coursework	and Outcomes are	e evaluated generall	v.				
Examination	,	5	<u>,</u>				
その他							
None during exam period							
Details of examination							
Other information							
Reference URL							
Office hours							
Deletions to attainment abiantions of learning and advantion							
Relations to attainment objectives of learning and education							
Key words							

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on						
	Electrical and Electronic Information Engineering]						
Schedule number	M42610020	Subject area	Advanced	Required or	Required		
			Electrical and	elective			
			Electronic				
			Information				
			Engineering				
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6		
Feaulty	Graduate Program	for Master's Degre		Subject made	1~2		
Department Offered	Electrical and Elec	ctronic Information	Engineering	Reggining	M2		
				grade	in2		
Charge teacher name[Roman	S2系教務委員 2I	kei kyomu Iin−S					
alphabet mark							
Numbering							
Objectives of class							
The thesis research aims to prov	vide a practical exp	erience of research	n work, and to acqu	ire his/her researd	ch skill with deep		
understanding of the electrical an	d electronic inform	ation engineering.					
Contents of class							
The research subject depends o	n the supervisor an	d the research gro	up you belong to. E	very student will h	nave an individual		
research subject. For more detail	s, please contact w	ith your supervisor.					
Self Preparation and Review							
Related subjects							
Notes for textbook							
Reference and material will be av	ailable from the sup	ervisor.					
Notes for reference							
Goals to be achieved							
To get something new on individu	al research fields.						
To develop his/her research skill	including the planni	ing and the presenta	ation.				
Evaluation of achievement	0 1	5					
Presentation, Thesis, Coursework	and Outcomes are	e evaluated generall	v.				
Examination	,		,				
None during exam period							
Note during examination							
Other information							
	Reference URL						
Office hours							
Relations to attainment objectives of learning and education							
Kay wanda							
ney words							

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on					
	Electrical and Elec	ctronic Information	Engineering]			
Schedule number	M4261002T	Subject area	Advanced	Required or	Required	
			Electrical and	elective		
			Electronic			
			Information			
			Engineering			
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6	
Faculty	Graduate Program	for Master's Degre	e	Subject grade	2~2	
Department Offered	Electrical and Elec	ctronic Information	Engineering	Beggining grade	M2	
Charge teacher name[Roman	S2系教務委員 21	kei kvomu Iin-S		graue		
alphabet mark]						
Numbering						
Objectives of class						
The thesis research aims to prov	/ide a practical exp	erience of researcl	n work, and to acqu	ire his/her researd	ch skill with deep	
understanding of the electrical an	d electronic informa	ation engineering.				
Contents of class						
The research subject depends or	n the supervisor an	d the research gro	up you belong to. E	very student will h	nave an individual	
research subject. For more detail	s, please contact w	ith your supervisor.				
Self Preparation and Review						
Related subjects						
Notes for textbook						
Reference and material will be av	ailable from the sup	ervisor.				
Notes for reference						
Goals to be achieved						
To get something new on individu	al research fields					
To develop his/her research skill	including the planni	ng and the present	ation.			
Evaluation of achievement						
Presentation. Thesis. Coursework	and Outcomes are	e evaluated generall	V.			
Examination	,					
None during exam period						
Details of examination						
· · · · · · · · · · · · · · · · · · ·						
Other information						
Reference URL						
Relations to attainment objectives of learning and education						
Key worde						
Noy Words						

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and						
	Electronic Inform	ation Engineering]			1		
Schedule number	M42610040	Subject area	Advanced	Required or	Required		
			Electrical and	elective			
			Electronic				
			Information				
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6		
		week,period			-		
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2		
Department Offered	Electrical and Electricae and Electricae and Electricae and Electricae and Electr	ctronic Information	Engineering	Beggining	M2		
				grade			
Charge teacher name[Roman	S2系教務委員 2I	kei kyomu Iin−S					
alphabet mark							
Numbering							
Objectives of class							
The seminar aims to provide a b	road understanding	of theoretical and	experimental appro	oches related to	the electrical and		
electronic information engineering	g tor the research w	ork of his/her mast	er thesis.				
	ممسقما استحبيا وطسمه		of master the!	الحافية معد معاط الم	الله المعالية معالية مع		
related field by reading reasonship	nental knowledge o	n the research work	or master thesis a	the supervices T	be appaured by		
individual supervisors	papers and monogra	apris. Contents of th	le class depend on	ule supervisor. 10	be announced by		
Self Preparation and Review							
Related subjects							
Notes for textback							
Textbook or material will be made	available from the	supervisor. To be a	nnounced by individ	ual cupanyicore			
Notes for reference		supervisor. To be a					
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 probl	em and the present	ation skill.			
Evaluation of achievement							
Coursework, presentation and/or	report.						
Examination							
None during exam period							
Details of examination							
Other information							
Reference URL							
Office hours	Office hours						
Relations to attainment objectives of learning and education							
Kay warda							
Ney words							

(M42610050)Seminar on Electrical and Electronic Information Engineering 1A[Seminar on Electrical and Electronic Information Engineering 1A]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1A[Seminar on Electrical and					
	Electronic Information Engineering 1A]					
Schedule number	M42610050	Subject area	- Advanced	Required or	Required	
			Electrical and	elective		
			Flectronic			
			Information			
			Engineering			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	4	
	1 Cal	week period	Internative	Of Ourclay		
Faculty	Graduate Program	for Master's Degre	20	Subject grade	1~2	
Department Offered	Electrical and Elec	ctronic Information	Engineering	Beggining	M1 M2	
				grade		
Charge teacher name[Roman	S2系教務委員 2I	kei kvomu Iin-S		8.000		
alphabet mark]		···· <b>,</b> ····· -				
Numbering						
		<b>.</b>				
The seminar aims to provide a b	road understanding	; of theoretical and	experimental appro	poches related to	the electrical and	
electronic information engineering	g tor the research w	/orк of his/her mast	ter thesis.			
			<b>,</b>			
The class provides both of funda	mental knowledge o	n the research work	ot 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	lual supervisors		
Notes for reference						
Ocele to be estimat						
To acquire fundamental knowledg	e on individual rese	arch fields.				
I o acquire the ability of finding a	problem, the ability	of solving the prob	lem and the present	tation skill.		
Evaluation of achievement						
Coursework, presentation and/or	report.					
Examination						
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						

(M42610060)Seminar on Electrical and Electronic Information Engineering 1B[Seminar on Electrical and Electronic Information Engineering 1B]

Subject name[English]	Seminar on Elect	trical and Electronic	Information Engin	eering 1B[Seminar	on Electrical and	
	Electronic Information Engineering 1B]					
Schedule number	M42610060	Subject area	Advanced	Required or	Required	
			Electrical and	elective		
			Electronic			
			Information			
			Engineering			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	2	
_		week,period				
Faculty	Graduate Program	n for Master's Degre	ee	Subject grade	2~2	
Department Offered	Electrical and Ele	ectronic Information	Engineering	Beggining	M2	
				grade		
Charge teacher name[Roman	S2系教務委員 2	kei kyomu Iin−S				
alphabet mark]						
Numbering						
Objectives of class						
Contents of class						
Contents of class						
Self Preparation and Review						
Related subjects						
Notes for textbook						
Notes for reference						
Goole to be echieved						
Goals to be achieved						
Evaluation of achievement						
Examination						
Details of examination						
Other information						
Deference LIDI						
0.55						
Relations to attainment objective	s of learning and e	ducation				
Key words						

#### (M42630110)Methodology of R & D 2[Methodology of R & D 2]

Subject name[English]	Methodology of R & D 2[Methodology of R & D 2]						
Schedule number	M42630110	Subject area	Advanced	Required or	Elective		
			Electrical and	elective			
			Electronic				
			Information				
			Engineering				
Time of starting a course	Spring term	Day of the	Tue.3~3	Credit(s)	2		
-		week,period					
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	1~2		
Department Offered	Electrical and Ele	ectronic Information	Engineering	Beggining	M1, M2		
				grade			
Charge teacher name[Roman	S2系教務委員 2	2kei kyomu Iin−S					
alphabet mark]							
Numbering	ELC_MAS58025						
Objectives of class							
The class aims to provide a ba	sic understanding	of R&D methodolog	gy related to the e	lectrical and elect	ronic information		
engineering for the research work	of his/her master	thesis.					
Contents of class							
The class provides some fundam	ental tips to condu	uct R&D work effect	tively. Contents of	the class depend o	n the supervisor.		
To be announced by individual su	pervisors		-				
Self Preparation and Review	-						
-							
Related subjects							
Notes for textbook							
Reference and material will be av	ailable from the su	pervisor.					
Notes for reference							
Goals to be achieved							
To acquire the ability of identif	ying and formulati	ng research probler	n, planning and im	plementing specific	research tasks,		
troubleshooting and communicati	ng outcomes.						
Evaluation of achievement							
Coursework and presentation are	evaluated general	ly.					
Examination							
None during exam period							
Details of examination							
Other information							
Reference URL							
Relations to attainment objectives of learning and education							
Kov wordo							
Ney words							

#### (M42630140)Physics for Electronics 1[Physics for Electronics 1]

Subject	Physics for Electronics 1[Physics for Electronics 1]					
name[English]						
Schedule number	M42630140	Subject area	Advanced	Required or	Elective	
			Electrical and	elective		
			Electronic			
			Information			
			Engineering			
Time of starting a	Spring term	Day of the	Wed.2~2	Credit(s)	2	
course		week,period				
Faculty	Graduate Program for Master's Degree			Subject	1~2	
				grade		
Department Offered	Electrical and Electronic Informa	tion Engineering		Beggining	M1, M2	
				grade		
Charge teacher	松田 厚範,服部 敏明,石山	武,高木 宏幸 🛛	MATSUDA Atsunori	, HATTORI Tos	shiaki, ISHIYAMA	
name[Roman alphabet	Takeshi, TAKAGI Hiroyuki					
mark]						
Numbering	ELC_MAS52025					
Objectives of class						

Objectives of this subject are to understand the fundamental aspects on functional materials, photonics, electrodics, spin electronics, and also to have overall knowledge on the latest technologies on these physical phenomena.

#### **Contents of class**

"Physics for Electronics 1" is composed of four topics of functional materials, photonics, electrodics, and spin electronics, which will be delivered for three times for each by four professors whose expertise lie on the individual categories.

The category of "Functional materials" is made to learn preparation, characterization and applications of functional materials for electronics and ionics based on physics and chemistry. The contents are 1) Fundamentals of amorphous and crystal, 2) Structure and property of glasses, 3) New preparation techniques of advanced materials, 4) Functional materials for ionis including Li-ion battery and fuel cell, and 5) Functional materials for optics including coatings, micro-optical components, and photonic devices.

The course of "photonics" is devoted to the understanding of interactions between photon (light wave) and materials based on the quantum theory and also to industrial applications of photonic devices. 1) Optoelectronic devices, 2) optical processes in semiconductors and exciton, 3) nanomaterial.

The category of "electrodics" is electrochemical reaction on electrode. The contents are 1) fundamentals of thermodynamics in aqueous solution, 2) fundamental of electrical double layer 3) fundamental of adsorption, 4) fundamentals of electrochemical reaction, and 5) applications of chemical sensor.

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

#### Self Preparation and Review

Students must perform their preparation and review of this subject based on the course materials with following the instruction of the teachers.

**Related subjects** 

Physics for Electronics, Analysis of Inorganic Materials, Advanced Materials for Electronics, Functional Materials for Optical Applications,

Textbook1	Book title	Physical Chemist	ry	ISBN	0198700725	
	Author	Atkins <b>Publisher</b> Oxford		Publish year	2006	
				University		
				Press		
Textbook2	Book title	Inorganic Chemist	try		ISBN	0199264635
	Author	Shriver	Publisher	Oxford	Publish year	2006
				University		
				Press		

Notes for textbook
None
Notes for reference
Goals to be achieved
(1) To understand fundamental aspects on functional materials, photonics, electrodics and spin electronics.
(2) To get the knowledge on the latest technologies on these physical phenomena.
Evaluation of achievement
The final evaluation will be the sum of four categories (25%); functional materials, photonics, electrodics, spin electronics.
Examination
None during exam period
Details of examination
Taking examination and submission of report will be explained and required by the teachers during their classes.
Other information
Photonics; Takeshi Ishiyama: ishiyama@ee.tut.ac.jp
Functional materials; Atsunori Matuda : matsuda@ee.tut.ac.jp
Electrodics; Toshiaki Hattori : thattori@ee.tut.ac.jp
Spin electronics: Hiroyuki Takagi : takagi@ee.tut.ac.jp
Reference URL
http://www.ee.tut.ac.jp/material
Office hours
one hour after every classes
Relations to attainment objectives of learning and education
Key words

functional materials, photonics, spin electronics, ionics, micro-optics, electrodics

# (M42630180)Electrical Technology and Materials 1[Electrical Technology and Materials 1]

Subject name[English]	Electrical Technology and Material	ls 1[Electrical Tec	hnology and Materia	als 1]		
Schedule number	M42630180	Subject area	Advanced	Required or	Elective	
			Electrical and	elective		
			Electronic			
			Information			
Time of starting	Savina towa	Day of the	Engineering	Orre dit/=)	2	
course	Spring Lerin	week period	wed.1~1	Urealt(S)	۷	
Faculty	Graduate Program for Master's De	gree	L	Subject	1~2	
-				grade		
Department Offered	Electrical and Electronic Information	on Engineering		Beggining	M1, M2	
Charge teacher		言 SLIDA Yachiwu		grade RAKAMI Yoshing	bu	
name[Roman_alphahet	, 法国 日口, 11日 2C米, 171上 我] 			a a o avia a o SfiifiC		
mark]						
Numbering	ELC_MAS53025					
Objectives of class						
This lecture is implemen	nted as an introduction to electrica	l energy systems	and intended for st	tudents and oth	er engineering	
disciplines. It is being us	seful as reference and self-study gu	ide for the profes	sional dealing with t	this important a	rea. There are	
following three sub cours	ses to choose from.					
This lecture is implemen	nted as an introduction to electrica	l energy systems	and intended for st	tudents and oth	her engineering	
aisciplines. It is being us	setul as reterence and self-study gu	nde for the profes	ssional dealing with	τηιs important a	rea. There are	
Contents of class	SES LO GNOUSE TROM.					
Sub Course 1(Y Sude)						
1. Fundamental concept	of electrical energy engineering					
2. Three-phase systems						
3. Power electronics						
Sub Course 2(R. Inada)						
1. Introduction of Electro	ochemical Energy Conversion Device	es				
2. Fundamentals of Elect	trochemical Energy Conversion Devi	ces				
3. Lithium-Ion Secondar	y Batteries (1)					
4. Lithium-Ion Secondary	y Batteries (2)					
J. Recent Trend in Elect	.rocnemicai ⊑nergy Conversion Devi ami)	ces				
1. Introduction of Flectri	c Energy Systems (1 week)					
2. High Voltage Engineer	ing and Electrical Insulation (2 week	s)				
3. Fundamental Propertie	es of Dielectrics and Electrical Insul	ating Materials(2 )	weeks)			
Sub Course 1(Y. Suda)						
1. Fundamental concept	of electrical energy engineering					
2. Three-phase systems						
3. Power electronics						
Jub Course 2(R. Inada)	schemical Energy Conversion Devi	<u>، د</u>				
2. Fundamentals of Floot	trochemical Energy Conversion Device	ces				
3. Lithium-Ion Secondary	y Batteries (1)					
4. Lithium-Ion Secondary	y Batteries (2)					
5. Recent Trend in Elect	rochemical Energy Conversion Devi	ces				
Sub Course 3(Yo. Muraka	ami)					
1. Introduction of Electri	c Energy Systems					
2. High Voltage Engineering and Electrical Insulation						
3. Fundamental Propertie	es of Dielectrics and Electrical Insul	ating Materials.				
Son Freparation and Re	VIGM					
Related subjects						
Basic electrical power er	ngineering course is prerequisite.					
Basic electrical power er	ngineering course is prerequisite.					
Notes for textbook	·					
Materials will be prepare	d by the lecturer.					

Reference1	Book title	Fuel Cell Systems	ISBN			
	Author	J. Larminie and A Dicks	Publisher	Wiley	Publish year	
Reference2	Book title	Lithium Ion Batteri	es: Science and	d Technologies	ISBN	
	Author	M. Yoshio, R.J. Brodd and A. Kozawa	Publisher	Springer-Verlag	Publish year	
Reference3	Book title	High Voltage Engin	eering	1	ISBN	
	Author	E. Kuffel, W. Zaengel and J. Kuffel	Publisher	Newnes	Publish year	
Notes for reference	e .				• • • • • • • • • • • • • • • • • • •	
Goals to be achiev	ed					
Evaluation of achie	<b>vement</b> n examinations(100%	5)				
Marks are based of	n examinations(100%	b).				
Examination		•				
定期試験を実施(対	対面)					
Examination(Face 1	to Face)					
Details of examina	tion					
Other information						
Reference URL						
Office hours						
Relations to attain	ment objectives of I	learning and education	1			

# (M42630220)LSI Process 1[LSI Process 1]

Subject name[English]	LSI Process 1[LS	I Process 1]				
Schedule number	M42630220	Subject area	Advanced	Required or	Elective	
			Electrical and	elective		
			Electronic			
			Information			
	0	<b>D C</b> 11	Engineering	0 (1)	•	
lime of starting a course	Spring term	Day of the week,period	Thu.2~2	Gredit(s)	2	
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	1~2	
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining grade	M1, M2	
Charge teacher name[Roman alphabet mark]	澤田 和明, 石川 SEKIGUCHI Hirot	靖彦, 関口 寛人 o. TAKAHASHI Kazı	、髙橋 一浩 SAW. uhiro	ADA Kazuaki, ISH	IKAWA Yasuhiko,	
Numbering	ELC_MAS55025	,				
Objectives of class						
From the viewpoint of deep unde	rstanding of LSI pro	ocesses, semicondu	ctors devices inclu	ding material desgir	n and an example	
of latest device will be lectured.	<b>.</b> .			0 0		
Contents of class						
Integrated circuits						
Device processing						
MEMS/NEMS						
Latest MOS FETs						
Current topics in IC/MEMS						
Self Preparation and Review						
Related subjects						
The basic knowledge on the quan	tum mechanics, the	ermodynamics, and e	electronics are desir	able.		
Semiconductor Physics Master c	ourse					
Notes for textbook						
Physics of Semiconducotr Device	s					
S.M.Sze, Willy						
Notes for reference						
Goals to be achieved						
(1) To understand fundamental as	pects on LSI proce	ess, and semiconduc	tor devices includin	g material design.		
(2) To get the knowledge on the l	atest technologies	on LSI process.				
Reports (100%)						
Examination その他						
Examination(Face to Face)						
Details of examination						
Other information						
K Sawada (C=605)						
$\mathbf{N}$ . Sawada (U=000)						
Sawadaeeee.uu.ac.jp H. Sekiguchi (C-610)						
sekiguchi@ee.tut.ac.ip						
ext. 6744						
K. Takahashi (C-406)						
takahashi@ee.tut.ac.jp						
ext. 6740						
Reference URL						
http://www.tut.ac.jp/english/intro	oduction/02EE.pdf					
(department)						
http://www.int.ee.tut.ac.jp/						

(devision)

 $\label{eq:http://www.tut.ac.jp/english/research/research_highlights.html (research activities)$ 

Office hours

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

Relations to attainment objectives of learning and education

Key words

#### (M42630240)Information and Communication Technology 1[Information and Communication Technology 1]

Subject name[English]	Information and Communication Technology 1[Information and Communication Technology 1]						
Schedule number	M42630240	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective		
Time of starting a course	Spring term	Day of the week,period	Mon.3~3	Credit(s)	2		
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2		
Department Offered	Electrical and Elec	ctronic Information	Beggining grade	M1, M2			
Charge teacher name[Roman alphabet mark]	大平 孝,上原 秀	大平 孝, 上原 秀幸, 竹内 啓悟 OHIRA Takashi, UEHARA Hideyuki, TAKEUCHI Keigo					
Numbering	ELC_MAS55025						

## **Objectives of class**

Students select one course from the following three courses:

A 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.

A 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.

The last course is intended for learning point-to-point communication systems, multiuser communication systems, and multiple-input multiple-output (MIMO) systems in the physical layer of wireless communications. Students challenge a unified understanding of existing advanced schemes in wireless communications.

#### **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 3 provided by Prof. Takeuchi:

1. Point-to-point communication systems

- 2. Multiuser communication systems
- 3. MIMO systems

# 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 3:

Basic understanding on modulation/demodulation, signal processing, probability theory, and information theory are prerequisite.

### Notes for textbook

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

Course 2: Instruct in 1st class.
Course 3: Same as Course 2.
Notes for reference
Goals to be achieved
Course 1:
<ul> <li>Understand the distributed constant elements and concept of scattering matrix.</li> </ul>
– 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:
<ul> <li>Understand the mechanism of medium access control and multi-hop communications</li> </ul>
<ul> <li>Understand the characteristics of ad hoc and sensor networks</li> </ul>
<ul> <li>Present a solution or a new application for the above</li> </ul>
Course 3:
- Understand the concept of detection, diversity, and channel uncertainty in point-to-point communication systems.
<ul> <li>Understand resource allocation and interference management in multiuser communication systems.</li> </ul>
- Understand statistical channel models and basic multiuser detection schemes in MIMO systems.
Evaluation of achievement
Course 1: Marks are based on the final test.
Course 2: Marks are based on reports and presentations.
Course 3: Marks are based on reports and tests.
Examination
Examination(Face to Face)
Details of examination
Other information
For e-mail address information, visit http://www.comm.ee.tut.ac.jp/
Reference URL
http://www.comm.ee.tut.ac.jp/
Office hours
Appoint a time slot via email
Relations to attainment objectives of learning and education
ney words

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

\_\_\_\_\_

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

	SI OCIONCO ANG LINE			o and Lingmoorning	4			
Subject name[English]	Seminar on Con	nputer Science an	d Engineering ILSe	eminar on Compu	ter Science and			
	Engineering I]							
Schedule number	M43610010	Subject area	Advanced	Required or	Required			
			Computer	elective				
			Science and					
			Engineering					
<b>T</b> '	V	Dec. of the	Lingineering	0	4			
lime of starting a course	rear	Day of the	Intensive	Gredit(s)	4			
		week,period						
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~2			
Department Offered	Computer Scienc	e and Engineering		Beggining	M1, M2			
				grade				
Charge teacher name[Roman	S3系教務委員-	23kei kyomu Iin-S2						
alphabet mark]								
Numbering								
Rambering	<u>,</u>							
Objectives of class								
The course is intended for stud	lents to study bas	sic materials in dep	th, related to his/	her research subje	ects in computer			
science and engineering.								
It is also aimed for students to a	acquire various skil	ls required in gener	ral research work	such as those for	oral presentation			
and technical discussion and write	ing	is, required in gene	a research work, s		orar presentation,			
and technical discussion and write	ing.							
Contents of class								
While specific contents depend	on the research ar	reas students are in	nvolved in. it is usu	ually the case for	students to read			
relevant textbooks/research pape	ers and report on th	hem, as well as to p	resent and discuss	on the research wo	ork of their own			
Solf Propagation and Paview								
Consult with your advisor.								
Related subjects								
Consult with your advisor.								
Notes for textbook								
Consult with your advisor.								
Notes for reference								
Coole to be askinved								
Goals to be achieved								
I o acquire abilities for technical i	readings in English,	logical thinking/exp	lanation, and clear p	presentation.				
Evaluation of achievement								
Will be evaluated by taking into	accout various fact	tors overall, such a	s technical explana	tion, question ansv	vering, discussion			
involvements and so on.								
Examination								
None during exam period								
Details of examination								
Other information								
Pafaranaa LIPI								
Office hours								
Relations to attainment objectives of learning and education								
Key words								
Ney Words								

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

			211111 Ion				
Subject name[English]	Seminar on Con	nputer Scier	ice an	d Engineering II[Se	eminar on Compu	ter Science and	
	Engineering II]						
Schedule number	M43610020	Subject ar	ва	Advanced	Required or	Required	
		-		Computer	elective		
				Science and			
				Engine suing			
				Engineering	<b>a</b> "'()		
Time of starting a course	Year	Day of	the	Intensive	Credit(s)	2	
		week,perio	d				
Faculty	Graduate Program	n for Master'	s Degre	e	Subject grade	2~2	
Department Offered	Computer Scienc	e and Engine	ering		Beggining	M2	
					grade		
Charge teacher name[Roman	S3系教務委員-	23kei kvomu	ı Iin-S2	)			
alphabet mark]		2					
Numbering							
Numbering							
Objectives of class							
The course is intended for stud	dents to study bas	sic materials	in dep	th, related to his/	her research subj	ects in computer	
science and engineering					-		
It is also aimed for students to a	acquire various skil	ls required i	n gene	ral research work	such as those for	oral presentation	
and technical discussion and write	ing	is, required i	in gene				
and technical discussion and write	ing.						
Contents of class							
While specific contents depend	on the research ar	reas students	s are i	nvolved in, it is usu	ally the case for	students to read	
relevant textbooks/research pape	ers and report on t	hem, as well a	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							
Goala to be aphieved							
			,				
To acquire abilities for technical i	readings in English,	logical thinki	ng∕ exp	ianation, and clear p	resentation.		
Evaluation of achievement							
Will be evaluated by taking into	accout various fac	tors overall,	such a	s technical explana	tion, question answ	vering, discussion	
involvements and so on.							
Examination							
None during exam period							
Details of examination							
Bodallo of oxalimation							
Other information							
Reference LIRI							
Office hours							
Relations to attainment objectives of learning and education							
רסומניטוש גע מנגמוווווסווג טטוסטגועסט טו וסמרווווע מחט פטעכמעטח							
Key words							

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer					
	Science and Engineering					
Schedule number	M43610030	Subject area	Advanced	Required or	Required	
			Computer	elective		
			Science and			
Time of starting a summer	0)/	Dave of the	Engineering	Our dit(a)	6	
Time of starting a course	Ztears	Day of the	Intensive	Great(s)	0	
Feeutry	Graduata Pragran	n for Mostor's Dorr		Subject mede	1~	
Paculty Department Offered	Graduate Frogran	a and Engineering	56	Subject grade	M1 M2	
Department Offered	Computer Scienc	e and Engineering		made		
Charge teacher name[Roman		3 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	mu lin-S. 3kei kakuk	grade		
elnhabet mark]				youn		
Numbering						
Objectives of class						
The course is intended for stude	nts to foster their i	nterests in research	n problems on comp	uter science and e	ngineering and to	
acquire ability for independent st	udies.					
It is also aimed for students to ac	cquire, through thes	sis research, cooper	ativeness, a sense o	of responsibility, ab	ilities for problem	
solving, research planning, decisio	on making, outcome	presentation and s	ubject investigation,	and to enhance th	eir creativity and	
persistency, among others.						
Contents of class						
It is usually the case that thesis	research is carried	out on individual ba	ses with specific co	ntents differing fro	m one student to	
another.						
Consult with your advisor for any	further details.					
Self Preparation and Review						
Consult with your advisor for the	m					
Related subjects						
Consult with your advisor for the	m					
Notes for textbook						
Consult with your advisor for the	m					
Sonsale with your advisor for the						
Notes for reference						
Goals to be achieved						
To acquire abilities for doing res	search and develop	ment at technically	, high level, sophist	icated decision ma	king, and leading	
large scale research projects.						
Evaluation of achievement						
Three faculty members will be a	assigned to prepar	e the evaluation fo	r your thesis resea	arch, based on pu	blication records,	
master thesis, and oral presentat	ion. It will be then	finalized by the facu	Ilty meeting.			
Examination						
その他						
None during exam period						
Details of examination						
Other information						
Defense i IDI						
Keterence UKL						
Office hours						
Relations to attainment objective	s of learning and e	ducation				

Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer					
Sabadula number	Science and Engin	neering	Advanced	Pequired or	Required	
Schedule humber	WI43010030	Subject area	Computer	elective	Required	
			Science and			
			Engineering			
Time of starting a course	2Years	Day of the week.period	Intensive	Credit(s)	6	
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	1~2	
Department Offered	Computer Science	e and Engineering		Beggining grade	M2	
Charge teacher name[Roman alphabet mark]	S3系教務委員, S	\$3系教務委員-23	kei kyomu Iin−S, 3ko	ei kyomu Iin-S2		
Numbering						
Objectives of class						
The course is intended for studer	nts to foster their i	nterests in research	problems on comp	uter science and e	ngineering and to	
acquire ability for independent stu	udies.					
It is also aimed for students to ac	quire, through thes	is research, cooper	ativeness, a sense o	of responsibility, ab	ilities for problem	
solving, research planning, decisio	on making, outcome	presentation and s	ubject investigation,	and to enhance th	eir creativity and	
persistency, among others.						
Contents of alacs						
Contents of class	research is carried	out on individual ha	ses with specific co	ntents differing fro	m one student to	
another.			ses with specific co	internes unrening iro	in one student to	
Consult with your advisor for any	further details.					
Self Preparation and Review						
Consult with your advisor for the	m.					
Related subjects						
Consult with your advisor for the	m.					
Consult with your advisor for the	m					
Sonsult with your advisor for the						
Notes for reference						
Goals to be achieved						
To acquire abilities for doing res	earch and develop	ment at technically	high level, sophist	icated decision ma	king, and leading	
large scale research projects.						
Evaluation of achievement						
Three faculty members will be a	assigned to prepare	e the evaluation fo	r your thesis resea	arch, based on pul	olication records,	
Framination	on. It will be then	Infalized by the fact	ity meeting.			
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

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer					
	Science and Engineering]					
Schedule number	M4361003T	Subject area	Advanced	Required or	Required	
			Computer	elective		
			Science and			
			Engineering			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6	
		week,period				
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2	
Department Offered	Computer Scienc	e and Engineering		Beggining	M2	
Charge teacher name[Roman	♀♀≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤≤	23kai kuomu lin-Si	)	grade		
alphabet mark]	30米秋初安貞		-			
Numbering						
Objectives of class						
The course is intended for stud	dents to study bas	sic materials in dep	th, related to his/	her research subje	ects in computer	
science and engineering.		In the second second second				
It is also almed for students to	acquire various skii	is, required in gene	ral research work, s	such as those for	oral presentation,	
	ing.					
Oomtonto of alass						
While specific contents depend	on the research ar	reas students are il	nvolved in, it is usi	ally the case for	students to read	
Solf Properation and Poview	ers and report on tr	iem, as well as to p	resent and discuss (	on the research wo	ork of their own.	
Sell Freparation and Neview						
<b></b>						
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/exp	lanation, and clear p	presentation.		
Evaluation of achievement						
Will be evaluated by taking into	accout various fact	tors overall, such a	s technical explana	tion, question ansv	vering, discussion	
involvements and so on.						
Examination						
None during exam period						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
1						
Key words						

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

Subject name[English]	Seminar on Computer Science and Engineering[Seminar on Computer Science and				
	Engineering]	1			
Schedule number	M43610040	Subject area	Advanced	Required or	Required
			Computer Science	elective	
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6
-		week,period			
Faculty	Graduate Prograr	n for Master's De	gree	Subject grade	2~2
Department Offered	Computer Scienc	e and Engineering		Beggining	M2
Charge teacher name[Pomen	C2 五	kai kuomu Iin-S		grade	
alphabet mark]	30宋秋初女員 3	kei kyönnä in 3			
Numbering					
Objectives of class					
The course is intended for stur	lents to study has	sic materials in d	enth related to his	/her research subi	ects in computer
science and engineering.					
It is also aimed for students to a	acquire various skil	lls, required in ger	eral research work,	such as those for	oral presentation,
and technical discussion and writ	ing.				
Contents of class					
While specific contents depend	on the research a	reas students are	involved in, it is us	sually the case for	students to read
relevant textbooks/research pape	ers and report on t	nem, as well as to	present and discuss	on the research wo	ork of their own.
Consult with your advisor					
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 i	readings in English,	logical thinking/ex	planation, and clear	presentation.	
Evaluation of achievement					
Will be evaluated by taking into	accout various fac	tors overall, such	as technical explana	ation, question ans	vering, discussion
involvements and so on.					
Examination					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and e	ducation			
-	-				
Key words					

## (M43630160)Quantum Biology and Materials Science[Quantum Biology and Materials Science]

Subject name[English]	Quantum Biology	and Materials	Scier	ice[Quantum Biolog	y and Materials Sci	ence]
Schedule number	M43630160	Subject are	a	Advanced	Required or	Elective
				Computer	elective	
				Science and		
				Engineering		
Time of starting a course	Spring term	Day of	the	Wed.1~1	Credit(s)	2
Feaulty	Graduate Program	n for Master's	Degr		Subject made	1~2
Department Offered	Computer Science	e and Enginee	ring		Beggining	M1 M2
					grade	,
Charge teacher name[Roman	栗田 典之,後藤	仁志 KURITA	A Nori	yuki, GOTO Hitoshi		1
alphabet mark]						
Numbering	CMP_MAS53025					
Objectives of class						
The objective of this class is to	understand basis b	piophysical phe	enome	na in the organisms	based on the cor	ncept of quantum
chemistry, that is, molecular orbit	al (MO) theory.					
In achieving this objective, studer	nts will be required	to attempt to	acqui	re the elementary c	oncepts in MO the	ory, and they will
The objective of this close is the	understand basis	piecules such	as pro	na in the organisms	1. based on the com	cent of quantum
chemistry that is molecular orbit	al (MO) theory	nopinysical prie	nome	na in the organisms		sope of quantum
In achieving this objective, studen	nts will be required	to attempt to	acqui	re the elementary o	oncepts in MO the	orv. and they will
learn about the electronic proper	ties of biological mo	olecules such	as pro	teins, RNA and DNA	λ.	ory, and anoy this
Contents of class	0					
Considering the preliminary know	ledge of the partici	ipates in this o	lass,	some topics from th	ne following things	will be chosen to
be learned.						
(1) Basis and elementary concept	s for molecular orb	oital (MO) theo	ry (1	and 2 weeks)		
(2) Applications of MO method to	small molecules (3	and 4 weeks)				
(3) MO calculations for amino aci	ds and their peptid	es (5 and 6 we	eks)			
(4) MO calculations for DNA, RNA	A bases and base p	airs (7, 8 and 9	) weel	(S)		
(5) MO calculations for complexes	s with proteins and	ligand molecu	les (1)	U, II and IZ weeks)		
(6) MO calculations for DNA, RNA	and their complex	tes with protei	ns (13	, 14 and 15 weeks)		
Considering the preliminary know	ledge of the partic	inates in this (	lace	some tonics from th	e following things	will be chosen to
be learned	ledge of the partici		<i>lass</i> ,		ie ronowing chings	will be chosen to
(1) Basis and elementary concept	s for molecular orb	oital (MO) theo	rv (1	and 2 weeks)		
(2) Applications of MO method to	small molecules (3	and 4 weeks)				
(3) MO calculations for amino aci	ds and their peptide	es (5 and 6 we	eks)			
(4) MO calculations for DNA, RNA	A bases and base p	airs (7, 8 and 9	) weel	(s)		
(5) MO calculations for complexe	s with proteins and	ligand molecu	les (1	0, 11 and 12 weeks)		
(6) MO calculations for DNA, RNA	A and their complex	es with protei	ns (13	8, 14 and 15 weeks)		
0 KD						
Self Preparation and Review						
Elementary concepts in MO theor	ry as well as biomo	lecules such a	s prot	eins, RNA and DNA	are required.	
Related subjects	ry as well as blomo	lecules such a	s prot	eiris, Rina and Dina	are required.	
Notes for textbook						
教科書:資料配付						
参考書:						
"Molecular orbital calculations for	r amino acids and p	eptides", by A	nne-I	Marie Sapse		
		-				
"Molecular orbital calculations for	r amino acids and n	eptides" hv A	nne-I	Marie Sapse		
	acted and p	,		<b>.</b>		
Notes for reference						

### Goals to be achieved

The objective of this class is to understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry.

The objective of this class is to understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry.

### Evaluation of achievement

授業で与えられた課題に対するレポート内容及びその発表内容(70%)、テスト(30%)の割合で、総合的に評価する。 Report (70%), Test (30%)

# Examination

レポートで実施 Regular Class

## Details of examination

# Other information

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 E-mail: kurita@cs.tut.ac.jp

Reference URL

### .....

## Office hours

上記の E-mail による連絡により、適宜対応する。

Please contact by the above E-mail.

Relations to attainment objectives of learning and education

### Key words

DNA, RNA, Protein, molecular orbital calculation DNA, RNA, Protein, molecular orbital calculation

#### (M43630280)Web Data Engineering 1[Web Data Engineering 1]

Subject name[English]	Web Data Engineering 1[Web Data Engineering 1]							
Schedule number	M43630280	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective			
Time of starting a course	Spring1 term	Day of the week,period	Thu.2~2	Credit(s)	1			
Faculty	Graduate Program for Master's De	Subject grade	1~2					
Department Offered	Computer Science and Engineering	Beggining grade	M1, M2					
Charge teacher name[Roman alphabet mark]	青野 雅樹 AONO Masaki							
Numbering	CMP_MAS52425							

#### Objectives of class

インターネット、すなわち Web 上には、大量のデータが日々作成・蓄積・更新されている。この中から有用なデータを検索し、抽 出する Web アプリケーション技術や、複数の Web アプリケーション間でデータをやりとりする技術も重要になってきている。特 に、このようなビッグデータをどう表現するかも、アプリケーションをカスケードする場合、必須である。

本講義では、Web 上やデータファイルにあるテキストだけでなく、画像、動画、3D モデルなど様々なメディアに対するデータ表現 技術、特徴量抽出技術、次元削減を含むインデクシング、テキストマイニング、データマイニング、自然言語処理、情報検索技 術、回帰・分類・クラスタリングに代表される統計的機械学習、リンク解析に代表される Web マイニング技術、ならびに深層学習 技術に焦点を当て、最新のデータサイエンス技術を講述する。

Day by day, massive data has been generated, accumulated, and updated on the Internet, where data include texts, images, movies, 3D shapes, and their composites. Extracting important pieces of information is crucial in may Web applications. The objectives of this class is to let students know the state-of-the art technologies in data science ranging from (big) data representation, data mining, text mining, natural language processing, information retrieval, information extraction, machine learning (including both supervised and unsupervised learning plus deep learning), based on fundamental data science technologies.

#### Contents of class

(1)はじめに(Web で扱うデータ、データサイエンス、統計的機械学習の基礎)

(2)情報検索序論(検索、類似度、言語モデル、次元削減,評価尺度)、自然言語処理の基礎

(3)マルチメディア特徴量抽出、検索、分類、深層学習基礎

(4)リンク解析、教師なし学習(クラスタリング技術)

(5)時系列データマイニング、教師あり学習(特徴抽出と分類)

(6)教師あり学習(特徴抽出と回帰)、評価手法、深層学習事例

(7+0.5) 定期テスト

(1) Introduction (Basics of Data Science including Data Representation and Statistical Machine Learning)

(2) Information Retrieval (Search, Similarity, Language Model, Dimensional Reduction, Evaluations), and Natural Language Processing

(3) Multimedia Feature Extraction, Search, Classification, Deep Learning Basics

(4) Web Link Analysis, Unsupervised Learning (Clustering)

(5) Time Series Data Mining, Supervised Learning (Classification)

(6) Supervised Learning (Regression), Evaluations, and Deep Learning Examples (7+0.5) Final Exam

### Self Preparation and Review

基本的なデータマイニング技術(主成分分析・判別分析・回帰分析、クラスタリング)に関しては、各自、予習・復習をしておくこと。特に、授業の補助用 Web ページで、Python (Jupyter notebook)を使った自習教材を準備するので、慣れておくことが好ましい。

It is desirable to self-study as well as to review fundamental data mining techniques such as clustering, classification, and regression. It should be noted that the knowledge on machine learning and multivariate analysis techniques such as principal component analysis is a prerequisite to this class. It is recommended installing Python into your computer, because some of the lecture materials are assumed the knowledge of Python.

Related subjects

Notes for textbook

	Book title	Information Retriev	al Implementi	ing and Evaluating	ISBN	978-0-262-
	Book and	Search Engines	a, inplomona		10211	02651-2
	Author	Stefan Buttcher.	Publisher	MIT Press	Publish vear	2010
	, autor	Charles L.A.			i ubiloir you	2010
		Clarke, Gordon V.				
		Cormack				
Reference2	Book title	Data Mining and Ana	lysis		ISBN	978-0-521-
		Ū				76633-3
	Author	Mohammed J.	Publisher	Cambridge	Publish year	2014
		Zaki, Wagner Meira		University		
		Jr.		Press		
Reference3	Book title	Data Mining Pract	cal Machine I	Learning Tools and	ISBN	978-0-12-
		Techniques, Third E	dition			374856-0
	Author	Ian H. Witten, Eibe	Publisher	Morgan	Publish year	2011
		Frank, and Mark A.		Kaufmann		
		Hall				
Reference4	Book title	Python Machine Lea	rning		ISBN	978-1-
						78355-513-
			I			0
	Author	Sebastian	Publisher	PACKT	Publish year	2016
		Raschka		Publishing		
参考書 6 書名「Google's Pag						
著者名:Amy N. La 出版社:Princeton ISBN:978-0-691- 出版年:2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher: Addison ISBN:978-0-321-4 Year:2011	eRank and Beyon ngville, Carl D. Me University Press I2202–1 mation Retrieval, aeza–Yates, Bertie Wesley I1691–9	d」 eyer the concepts and tech er Ribeiro-Neto	nology behind s	search, Second Editio	J	
著者名: Amy N. La 出版社: Princeton ISBN: 978-0-691- 出版年: 2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher: Addison ISBN: 978-0-321-4 Year: 2011 Reference #6 Title:「Google's Pag Authors: Amy N. La Publisher: Princeto ISBN: 978-0-691-7 Year: 2006	eRank and Beyon ngville, Carl D. Me University Press I2202–1 mation Retrieval, aeza–Yates, Bertie Wesley 11691–9 geRank and Beyon angville, Carl D. Mo n University Press I2202–1	d」 eyer the concepts and tech er Ribeiro-Neto d」 eyer s	nology behind s	search, Second Editio	]	
著者名: Amy N. La 出版社: Princeton ISBN: 978-0-691- 出版年: 2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher: Addison ISBN: 978-0-321-4 Year: 2011 Reference #6 Title:「Google's Pag Authors: Amy N. La Publisher: Princeto ISBN: 978-0-691- Year: 2006	eRank and Beyon ngville, Carl D. Me University Press I2202–1 mation Retrieval, aeza–Yates, Bertie Wesley 11691–9 geRank and Beyon angville, Carl D. Mo n University Press I2202–1	d」 eyer the concepts and tech er Ribeiro-Neto d」 eyer s	nology behind s	search, Second Editio	Du ]	
著者名: Amy N. La 出版社: Princeton ISBN: 978-0-691- 出版年: 2006 Reference #5 Title: 「Modern Infor Authors: Ricardo Ba Publisher: Addison ISBN: 978-0-321-4 Year: 2011 Reference #6 Title: 「Google's Pag Authors: Amy N. La Publisher: Princeto ISBN: 978-0-691- Year: 2006 Goals to be achievee (1)データサイエンス (2)情報検索(自然: (3)機械学習(分類、 (4)リンク解析、Web	eRank and Beyon ngville, Carl D. Me University Press [2202-1 mation Retrieval, aeza-Yates, Bertie Wesley 41691-9 reRank and Beyon angville, Carl D. M n University Press [2202-1 d く・データマイニン/ 言語処理、文書検 回帰分析、クラス マイニング解析、	d」 syer the concepts and tech er Ribeiro-Neto d」 eyer s ブ(データ表現、主成分 索・メディア検索、類似 .タリング)ならびに深層 時系列データ解析等の	nology behind s 分析に代表され 定、ランキング 学習の基礎技術が理	search, Second Editio nる多変量解析)の基 の基礎技術が理解 術が理解できること 解できること	on」 基礎技術が理解で できること	ぎること
著者名:Amy N. La 出版社:Princeton ISBN:978-0-691- 出版年:2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher: Addison ISBN:978-0-321-4 Year:2011 Reference #6 Title:「Google's Pag Authors: Amy N. La Publisher: Princeto ISBN:978-0-691- Year:2006 <b>Goals to be achieve</b> (1)データサイエンス (2)情報検索(自然) (3)機械学習(分類、 (4)リンク解析、Web	eRank and Beyon ngville, Carl D. Me University Press [2202-1 mation Retrieval, aeza-Yates, Bertie Wesley 41691-9 geRank and Beyon angville, Carl D. Me n University Press [2202-1 d 、・データマイニング 言語処理、文書検 回帰分析、クラス マイニング解析、	d」 syer the concepts and tech er Ribeiro-Neto d] eyer s グ(データ表現、主成分 索・メディア検索、類似 、タリング)ならびに深層 時系列データ解析等の	nology behind s 分析に代表され 度、ランキング 学習の基礎技 が理	search, Second Editio いる多変量解析)の基 )の基礎技術が理解 術が理解できること 解できること	on」 基礎技術が理解で できること	ぎきること
著者名: Amy N. La 出版社: Princeton ISBN: 978-0-691- 出版年: 2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher: Addison ISBN: 978-0-321-4 Year: 2011 Reference #6 Title:「Google's Pag Authors: Amy N. La Publisher: Princeto ISBN: 978-0-691- Year: 2006 Goals to be achievee (1)データサイエンス (2)情報検索(自然] (3)機械学習(分類、 (4)リンク解析、Web	eRank and Beyon ngville, Carl D. Me University Press [2202-1 mation Retrieval, aeza-Yates, Bertie Wesley 41691-9 geRank and Beyon angville, Carl D. Me n University Press [2202-1 d 、・データマイニング 言語処理、文書検 、マイニング解析、 pave to be achieve	d」 syer the concepts and tech er Ribeiro-Neto d] eyer s グ(データ表現、主成分 索・メディア検索、類似 .タリング)ならびに深層 時系列データ解析等の ed:	nology behind s 分析に代表され 度、ランキング 学習の基礎技術が理	search, Second Editio いる多変量解析)の基 の基礎技術が理解 術が理解できること 解できること	on」 基礎技術が理解で できること	ぎきること
著者名:Amy N. La 出版社:Princeton ISBN:978-0-691- 出版年:2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher:Addison ISBN:978-0-321-4 Year:2011 Reference #6 Title:「Google's Pag Authors:Amy N. La Publisher:Princeto ISBN:978-0-691- Year:2006 Goals to be achievee (1)データサイエンス (2)情報検索(自然計 (3)機械学習(分類、 (4)リンク解析、Web	eRank and Beyon ngville, Carl D. Me University Press [2202-1 mation Retrieval, aeza-Yates, Bertie Wesley 41691-9 geRank and Beyon angville, Carl D. Me n University Press [2202-1 d く・データマイニング 言語処理、文書検 回帰分析、クラス マイニング解析、	d」 syer the concepts and tech er Ribeiro-Neto d] eyer s グ(データ表現、主成分 索・メディア検索、類似 タリング)ならびに深層 時系列データ解析等の ed: nental data science (mi	nology behind s 分析に代表され 度、ランキング 学習の基礎技 の基礎技術が理 ning) technolog	search, Second Editio いる多変量解析)の基 の基礎技術が理解 術が理解できること 解できること gies.	on」 基礎技術が理解で できること	きること
著者名:Amy N. La 出版社:Princeton ISBN:978-0-691- 出版年:2006 Reference #5 Title:「Modern Infor Authors:Ricardo Ba Publisher:Addison ISBN:978-0-321-4 Year:2011 Reference #6 Title:「Google's Pag Authors:Amy N. La Publisher:Princeto ISBN:978-0-691- Year:2006 Goals to be achievee (1)データサイエンス (2)情報検索(自然計 (3)機械学習(分類、 (4)リンク解析、Web The following items I 1. Able to underst	eRank and Beyon ngville, Carl D. Me University Press [2202-1 mation Retrieval, aeza-Yates, Bertie Wesley 41691-9 geRank and Beyon angville, Carl D. Me n University Press [2202-1 d 、・データマイニング 属 、マイニング解析、 nave to be achieve and apply fundam and fundamental	d」 syer the concepts and tech er Ribeiro-Neto d] eyer s グ(データ表現、主成分 索・メディア検索、類似 タリング)ならびに深層 時系列データ解析等の ed: nental data science (mi technologies of info	nology behind s 分析に代表され 度、ランキング 学習の基礎技 の基礎技術が理 ning) technolog rmation_retriev	search, Second Editio いる多変量解析)の基 の基礎技術が理解 術が理解できること 解できること gies. val such as natura	on」 基礎技術が理解で できること I language proce	きること essing, search

4. Able to understand basics of Web link analysis, Wen content mining, Time series data mining
Evaluation of achievement
原則として、すべての授業に出席したものにつき、下記のように成績を評価する。
定期試験 80 点、課題 20 点の合計で評価する。
A: 80 点以上, B: 65 点以上, C: 55 点以上
In principle, for those who have attended all the classes, the credit will be given as follows:
Exercise (20%) and Final exam (80%)
A: (>=80) B: (>=65) C: (>= 55)
Examination
Examination(Face to Face)
Details of examination
Other information
C-511, TEL: 6764 Email: aono@tut in
Masaki Anno (C-511) anno@tut in
http://www.kde.cs.tut.ac.jp/ aono/myLecture.htm
http://www.kde.cs.tut.ac.jp/ aono/myLecture.html
UTICE nours 防止だが、東前にの
随時にか、事前に aono@tut.jp まで电子メールで予約をとること。 Amatima but it is recommended that a priori amail appointment is preferable
Anytime, but it is recommended that a priori email appointment is preferable.
Key words
データ・テキストマイニング、情報検索、特徴量抽出、機械学習、深層学習
data and text mining, information retrieval, feature extraction, machine learning, deep learning

(M43630340)Statistical	Natural Language Processing[Statistical Natural Language Processing]

Subject name[English]	Statistical Natural Language Processing[Statistical Natural Language Processing]					
Schedule number	M43630340		Subject area	Advanced	Required or	Elective
				Computer	elective	
				Science and		
				Engineering		
Time of starting a	Spring1 term	1	Day of the week period	Wed.2~2	Credit(s)	1
Faculty	Graduate Pr	ogram for Master's	Degree		Subject	1~2
Department Offered	Computer Se	cience and Engineer	ring		Beggining	M1, M2
Channa taaahan	利益 专自 /	KIRA Tomovoshi			grade	
charge teacher	松果 及及 /	ANIDA Tomoyoshi				
manie[Roman alphabet						
Numbering	CMP MAS52	525				
Objectives of class		.020				
Ubjectives of class			e will be discusse.	d hu facusing on sta	tistical messions	tuonolotion
Important topics on sta	tistical natural	language processing	g will be discussed	d by focusing on sta	tistical machine	translation.
Week 1: Introduction						
Week 2: Basic of Proba	bility and Statis	SUCS				
Week J. Language Mode	ns delc					
Week 4. Translation Wo						
Week 5: Parameter Esti Week 6: EM Algerithm	mation					
Week 0. Elvi Algoriumi Week 7: Advenged meth	TM2 ain SMT					
Solf Properation and Pr						
Sell Preparation and Re	241044					
Related subjects						
Information theory, Form	nal language th	neory				
Notes for textbook						
Resumes will be provide	ed, which are b	ased on:				
<ul> <li>Kevin Knight</li> </ul>						
A Statistical MT Tutoria	al Workbook					
•Seiichi Nakagawa et al						
Spoken Language Proce	essing and Nati	ural Language Proce	essing			
Reference1	Book title	Statistical Machi	ne Translation		ISBN	978-
			-			0521874151
	Author	Philipp Koehn	Publisher	Cambridge University	Publish year	2010
Reference2	Book title	A Statistical MT	I Tutorial Workbool	rress (	ISBN	
	Author	Kevin Knight	Dublicher		Dublich vear	
	Aution	Nevin Kinghe	rubiisitei		Fublish year	
Notes for reference						
Goals to be achieved						
Basics: Understand the	basic concept	s of natural languag	e processing			
Natural Language Proc	essing: Unders	tand the role of la	nguage resources	, language and tran	slation models,	word alignments,
and parameter estimation	on methods,					
Applications: Understa	nd statistical m	achine translation s	system.			
Evaluation of achievem	ent					
Marks are based on rep	orts (100%).					
Examination						
By Report						
Details of examination						

## Other information

Tomoyosi Akiba: C-505, 44-6758, akiba@cs.tut.ac.jp

Reference URL

http://www.cl.ics.tut.ac.jp/~akiba/

Office hours

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

# (M43630350)Advanced Chemoinformatics 1[Advanced Chemoinformatics 1]

Subject name[English]	Advanced Chemo	oinformatics 1[Adva	nced Chemoinformat	ics 1]	
Schedule number	M43630350	Subject area	Advanced	Required or	Elective
			Computer	elective	
			Science and		
Time of all the second	Sauto1 t-	Day of th	Engineering	Oue dit/-1	1
i ime ot starting a course	Spring I term	Day of the	Mon.3~3	Great(s)	1
Faculty	Graduate Program	m for Master's Degr	ee	Subject grade	1~2
Department Offered	Computer Science	ce and Engineering		Beggining	M1, M2
	·	6 6		grade	
Charge teacher name[Roman	高橋 由雅 TAKA	AHASHI Yoshimasa			
alphabet mark]					
Numbering	CMP_MAS53225				
Objectives of class					
The purpose of this course is t	o introduce and e	explain practical an	d applied approache	s to data analysis	s (or mining) and
knowledge discovery with illustra	tive examples in cl	hemistry and molec	ular biology. The cou	arse is helpful for	the students who
are interested in not only pursuin	g careers in chemo	p-informatics but als	o taking general dat	a science.	
I opics to be covered:					
1.Chemical data space and multiv	arıate data analysi	s			
2.Quantitative structure-activity	relationships and k	nowledge aquisition			
3. Visualization of higher dimensio	nal data of molecul	les			
5 Eundamentals of machine learning	y and its application	Dri			
6 Artificial neural network and ch	emical application				
7.Support vector machine and ch	emical application				
8.Exam.					
Self Preparation and Review					
Related subjects					
Molecular Informatics Linear Alg	ebra. Elementary A	nalytics			
Notes for textbook	, <u> </u>				
Material will be made available in	the form of hard co	opies or on the clas	s website (to be ann	ounced).	
Notes for reference					
Goals to be achieved					
/They understand regression an	alvsis technique ba	ased on linear least	squares method ar	nd the application	to chemical data
fitting.					
/They learn fundamentals of quar	ntitative structure-	activity relationship	s (QSAR)		
/They learn mathematical basis o	f principal compon	ent analysis and vis	ualization of multivar	iate chemical data	space.
/They understanad usefulness ar	id importance of st	ructural similarity in	intelligent molecular	r information proce	essing.
/They learn mathematical basis of	f machine learning				
/Artificial neural network (ANN) a	and applicaton in cl	hemistry.			
/Support vector machine (SVM)	and application in c	rug design and deve	lopment.		10
I ney acquire the abilities how the	ey can apply the m	etnods to chemical	data analysis, data c	iassification and pr	realction.
Reports and classroom performan	1CE 20%				
written examination 80	J70				
[Evaluation basis] Students who	attend all classes v	vill be evaluated as	ollows:	• • • •	
A: Achieved all goals and obtained	a total points of ex	am and reports, 80	or nigner (out of 100	f 100 points).	
D. Achieved 10 % of goals and ob	lairied total points	or exam and reports	, up or nigher (out o	i iou points).	

C: Achieved 60 % of goals and obtained total points of exam and reports, 55 or higher (out of 100 points). **Examination** 

Examination(Face to Face)
Details of examination

# Other information

Office: F-303 (Ext. 6878) Email: taka@cs.tut.ac.jp (Takahashi)

## Reference URL

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

**Office hours** Friday 13:00-14:30

Relations to attainment objectives of learning and education

## Key words

chemoinformatics, bioinformatics, multivariate data analysis, QSAR, chemometrics, pattern recognition, machine learning, data maining

# (M43630360)Advanced Chemoinformatics 2[Advanced Chemoinformatics 2]

Subject name[English]	Advanced Chemo	informatics 2[Advar	ced Chemoinformat	tice 2]	
Sobedule number	M43630360	Subject area		Bequired or	Elective
	10143030300	Subject area	Computor	cleative	LIECTIVE
			Computer	01000140	
			Science and		
The first stars	0 . 0 .		Engineering	0	1
lime of starting a course	Spring2 term	Day of the	Mon.3~3	Gredit(s)	1
		week,period		<u></u>	1.0
	Graduate Program	1 for Master's Degre	e	Subject grade	1~2
Department Offered	Computer Science	e and Engineering		Beggining	MI, MZ
	+			grade	
Charge teacher name Roman	木疋 To be assign	ned			
alphabet mark					
Numbering	CMP_MAS53225				
Objectives of class					
Contents of class					
O IS Dura constitution and Devidence					
Self Preparation and Review					
Related subjects					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Frankastan					
授美と定期試験(対面)	. – 、				
Regular Class and Examination(Fa	ace to Face)				
Details of examination					
Other information					
Reference URL					
055					
Relations to attainment objective	es of learning and e	ducation			
Key words					

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

Subject name[English]	Seminar on Environmental and Life Science [Seminar on Environmental and Life Science ]					
Schedule number	M44610010	Subject area	Advanced	Required or	Required	
			Environmental	elective	Roquirou	
			and Life	0.000110		
			Sciences			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	3	
_		week,period				
Faculty	Graduate Program	n for Master's Degre	ee	Subject grade	1~2	
Department Offered	Environmental an	d Life Sciences		Beggining	M1, M2	
				grade		
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 stu	udents with opport	unities to study or	n his/her research	subjects on enviro	onmental and life	
sciences by reading textbooks a	nd scientific paper	s under the guidance	ce of his/her superv	isor. The aim of t	ne lessen for the	
students is to learn knowledge an	nd presentation skil	Is required for his/h	ner research in the s	eminar as well as t	o deepen his/her	
understanding of environmental a	nd life sciences.					
Contents of class						
The students will be required to	read textbooks and	d papers written by	other language than	Japanese, especia	lly English, which	
are suggested by his/her supervi	sor, and to report a	and discuss deeply d	on his/her research :	subject in the semi	nar.	
Self Preparation and Review						
Related subjects						
Seminar on Environmental and Li	fe Science II					
Thesis Research on Environment	al and Life Science					
All other relevant subjects in Adv	/anced Environmen	tal and Life Science	S			
Notes for textbook						
Supervisor will recommend textb	ooks, papers, and r	esearch materials to	o students.			
Notes for reference						
Goals to be achieved						
To acquire basic knowledge on e	nvironmental and lif	fe sciences				
To understand the contents of se	cientific papers in a	given field of envir	onmental and life sci	ences		
To be able to make oral and post	er presentations re	elevant to papers he	∕she has read.			
Evaluation of achievement						
The evaluation is based on the	scores of reading	textbooks and scie	ntific papers, discus	sions, reports and	presentations of	
his/her research in the seminar.	His/her supervisor	evaluates the score	es.			
Examination						
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 objective	es of learning and e	ducation				
Key words						
Environmental science and techn	ology, life science,	materials science a	nd engineering, appli	ed chemistry		

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

Subject name[English]	Seminar on Environmental and Life Science II Seminar on Environmental and Life Scie					d Life Science II]	
Schedule number	M44610020	Subje	ct are	a	Advanced	Required or	Required
		_			Environmental	elective	
					and Life		
					Sciences		
Time of starting a course	Year	Day week,	of period	the	Intensive	Credit(s)	3
Faculty	Graduate Program	n for Ma	aster's	Degre	e	Subject grade	2~2
Department Offered	Environmental an	d Life S	cience	s		Beggining	M2
						grade	
Charge teacher name[Roman	S4系教務委員 4	kei kyor	nu Iin-	·S			
alphabet mark]							
Numbering							
Objectives of class							
Based on the Seminar on Enviro	nmental and Life S	cience	I, this	cours	e will further provide	e the students with	n the opportunity
to study on his/her research sub	ject in environment	tal and I	life sci	ences	by reading textbook	s and papers unde	r the guidance of
his/her supervisor. The student	s will learn the kn	owledge	e and	the p	resentation skills re	quired for his/her	research in the
seminar.							
Contents of class							
The students will be required to	read textbooks and	l papers	s writte	en by	other language than	Japanese, especia	Illy English, which
are suggested by his/her supervi	sor, and to report a	nd disc	uss de	eply o	on his/her research s	subject in the semi	nar.
Self Preparation and Review							
Related subjects							
Seminar on Environmental and Li	fe Science I						
Thesis Research on Environment	al and Life Science						
All other relevant subjects in Adv	anced Environmen <sup>.</sup>	tal and I	Life So	cience	S		
Notes for textbook							
Supervisor will recommend textb	ooks, papers, and re	esearch	mater	ials to	o students.		
Notes for reference							
Goals to be achieved							
To acquire basic knowledge on e	nvironmental and lif	e scien	ces				
To understand the contents of so	cientific papers in a	given f	ield of	envir	onmental and life sci	ences	
To be able to make oral and post	er presentations re	levant t	o pape	ers he	/she has read.		
Evaluation of achievement							
The evaluation is based on the	scores of reading	textboo	ks and	l scie	ntific papers, discus	sions, reports and	presentations of
his/her research in the seminar.	His/her supervisor	evaluat	es the	score	S.		
Examination							
None during exam period							
Details of examination							
0.1							
Students are encouraged visiting	hy appointment						
Relations to attainment objective	s of learning and a	ducatio	n				
		auouuo					
1							
Key words							
Environmental science and techn	ology, life science,	materia	ls scie	nce a	nd engineering, applie	ed chemistry	

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

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

### **Objectives of class**

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

#### **Contents of class**

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

#### Related subjects

Seminar on Environmental and Life Science I

Seminar on Environmental and Life Science II

Notes for textbook

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

Notes for reference

### Goals to be achieved

To acquire basic knowledge on environmental and life sciences

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

To be able to make safety control in experimental work

### Evaluation of achievement

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

#### etc). Examination

その他

None during exam period

#### **Details of examination**

Other information

Supervisor

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

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

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

### **Objectives of class**

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

#### **Contents of class**

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

#### Related subjects

Seminar on Environmental and Life Science I

Seminar on Environmental and Life Science II

Notes for textbook

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

Notes for reference

### Goals to be achieved

To acquire basic knowledge on environmental and life sciences

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

To be able to make safety control in experimental work

### **Evaluation of achievement**

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

Examination

None during exam period

Details of examination

Other information

Supervisor

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

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

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]				
Schedule number	M4461003T	Subject area	Advanced Environmental and Life Sciences	Required or elective	Required
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6
		week,period			
Faculty	Graduate Program for Master's Degree			Subject grade	2~2
Department Offered	Environmental and Life Sciences			Beggining	M2
				grade	
Charge teacher name[Roman	S4系教務委員 4kei kyomu Iin-S				
alphabet mark]					
Numbering					

### **Objectives of class**

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

#### **Contents of class**

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

#### Related subjects

Seminar on Environmental and Life Science I

Seminar on Environmental and Life Science II

## Notes for textbook

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

Notes for reference

### Goals to be achieved

To acquire basic knowledge on environmental and life sciences

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

To be able to make safety control in experimental work

## **Evaluation of achievement**

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

# Examination

None during exam period

### Details of examination

Dorano di Orguninacioi

### 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

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

Subject name[English]	Seminar on Environmental and Life Science[Seminar on Environmental and Life Science					_ife Science]
Schedule number	M44610040	Subject are	a	Advanced	Required or	Required
				Environmental	elective	
				and Life		
				Sciences		
Time of starting a course	Year	Day of week,period	the I	Intensive	Credit(s)	6
Faculty	Graduate Progran	n for Master's	Degr	ee	Subject grade	2~2
Department Offered	Environmental and	d Life Science	es		Beggining	M2
					grade	
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 stu	idents with the op	portunity to	study	on his/her researd	h subject in enviro	onmental and life
sciences by reading textbooks ar	nd papers under the	e guidance of	his/h	er supervisor. The st	udents will learn th	ne knowledge and
the presentation skills required fo	or his/her research	in the semina	ar.			
Contents of class			•-			
The students will be expected	to read textbooks	and papers	writt	en by toreign langu	age that are indic	ated by his/her
supervisor, and report and discus	s aeepiy on his/hei	r research su	oject i	n the seminar.		
Son Freparation and Review						
Related subjects						
Thesis Research on Environment	al and Life Science					
All other relevant subjects in Adv	anced Environment	tal and Life S	cience	s		
Notes for textbook						
Supervisor will recommend textb	ooks and papers to	students.				
Notes for reference						
To understand the contents of a	nvironmental and lif	e sciences	onvir	apmontal and life asi	00000	
To be able to make oral and nost	er presentations re	levant to nan	ers he	/she has read	ences	
		lovane to pup				
Evaluation of achievement						
The evaluation is based on the	scores of reading	papers, discu	ssions	, reports and prese	ntations of his/hei	r research in the
seminar. His/her supervisor evalu	ates the scores.					
Examination						
None during exam period						
Details of examination						
Others is formati						
Supervisor						
Reference URL						
http://ens.tut.ac.ip/en/						
Office hours						
Students are encouraged visiting	by appointment.					
Relations to attainment objective	s of learning and e	ducation				
Kauwanda						
Ney words						

## (M44630100)Special Topics in Applied Organic Chemistry[Special Topics in Applied Organic Chemistry]

Subject name[English]	Special Tapico in	Applied Or	rania Ch	omista/Special Ten	ion in Applied Organ	aia Chamiatrul				
Cahadula mumban	Special Topics in Applied Organic Chemistry Special T			Advensed	Dominad	Elective				
Schedule number	10144030100	Subject	rea	Advanced	Required or	Elective				
				Environmental	elective					
				and Life						
Time of starting a source	Spring1 term	Day o	the		Credit(a)	1				
Time of starting a course	Spring r term	week per	od	Tue.5 - 5	Or Buil(s)	•				
Faculty	Graduate Program	n for Maste	r's Degr	ee	Subject grade	1~2				
Department Offered	Environmental an	d Life Scie	nces		Beggining	M1, M2				
-					grade					
Charge teacher name[Roman	岩佐 精二,柴富	一孝 IWA	SA Seiji,	SHIBATOMI Kazuta	ka					
alphabet mark]										
Numbering	ENV_MAS52225									
Objectives of class										
To provide you with a working kr	owledge of advance	ed synthesi	s of mol	ecular materials.						
Contents of class										
This course includes the detail of	of the most recent	progress in	moderr	synthetic application	on of catalysis, org	anometallics, and				
the total synthesis of natural pro	ducts on the basis	of retrosyr	thetic a	nalysis.						
1. Total synthesis of bioactive or	ganic compounds. (	Iwasa)								
2. Advanced modern synthetic of	rganic reactions usi	ng transitio	n metals	. (Iwasa)						
3. Basic concept of oxidative add	lition and reductive	eliminatior	in catal	ytic cycles. (Iwasa)						
4. Synthetic applications of asym	imetric synthesis ar	nd asymme	ric cata	ysts. (Iwasa)						
5. Basic concept of Lewis acid c	atalyst and organoc	atalyst. (Sl	ibatomi)							
6. Advanced Lewis acid catalysis	in organic synthes	is. (Shibato	ni)							
7. Advanced organocatalysis in o	rganic synthesis. (S	shibatomi)								
8. Organofluorine chemistry. (Shi	batomi)									
Self Preparation and Review										
Related subjects										
Subjects related to Organic Cher	mistry									
Notes for textbook										
No textbook is required.										
Some of information in WebCT w	ill be help for your	understand	ng on tr	is course.						
Notes for reference										
Goals to be achieved										
A firm understanding on catalys	t, stereochemistry,	reaction	nechanis	sm, and their applica	ation for the synthe	esis of molecular				
materials is achieved.										
The second and second from the second s	The report on papers from scientific journals such as J.A.C.S and Angew. Chem. will be imposed.									
The report on papers from scien	tific journals such a	is J.A.C.S a	nd Ange	w. Chem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination	tific journals such a Ilar material.	is J.A.C.S a	nd Ange	w. Chem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その地	tific journals such a Ilar material.	is J.A.C.S a	nd Ange	w. Gnem. wiii be imp	osed.					
The report on papers from scien A design of novel organic molecu <b>Examination</b> その他 By Report	tific journals such a ılar material.	s J.A.C.S a	nd Ange	w. Chem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination	tific journals such a ılar material.	IS J.A.C.S a	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molect Examination その他 By Report Details of examination	tific journals such a ılar material.	IS J.A.C.S a	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information	tific journals such a Ilar material.	s J.A.C.S a	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information For more information:	tific journals such a Ilar material.	s J.A.C.S a	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information For more information: Seiji Iwasa: room (B-506) e-mail	tific journals such a Ilar material. (iwasa@ens tut ac i	is J.A.C.S a	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information For more information: Seiji Iwasa: room (B-506), e-mail Kazutaka Shibatomi: room (B-50	tific journals such a Ilar material. (iwasa@ens.tut.ac.j 7), e-mail (shiba@er	ip)	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information For more information: Seiji Iwasa: room (B-506), e-mail Kazutaka Shibatomi: room (B-50 Reference URL	tific journals such a Ilar material. (iwasa@ens.tut.ac.j 7), e-mail (shiba@er	ip) ns.tut.ac.jp)	nd Ange	w. Gnem. will be imp	osed.					
The report on papers from scien A design of novel organic molecu Examination その他 By Report Details of examination Other information For more information: Seiji Iwasa: room (B-506), e-mail Kazutaka Shibatomi: room (B-50 Reference URL http://material.tutms.tut.ac.ip/S	tific journals such a Ilar material. (iwasa@ens.tut.ac.j 7), e-mail (shiba@er TAFF/IWASA/index	ip) ns.tut.ac.jp)	p://ens	tut.ac.jp/orgchem/	osed.					

Office hours anytime.

Relations to attainment objectives of learning and education

Key words

molecular catalyst, total synthesis, natural product, asymmetric synthesis, transition metal

# (M44630110)Developmental Neuroscience[Developmental Neuroscience]

Subject name[English]	Developmental Neuroscience[Developmental Neuroscience]					
Schedule number	M44630110	Subject	area	Advanced	Elective	
				Environmental	elective	
				and Life		
				Sciences		
Time of starting a course	Spring2 term	Day o	f the	Tue.2~2	Credit(s)	1
<b>-</b>	0 1 1 0	week,per	iod		<u></u>	1.0
Faculty	Graduate Program	1 TOT Maste	er s Degr	ee	Subject grade	1~2
Department Offered	Environmental and		nces		Beggining	1011, 1012
Charge teacher name[Roman	吉田 祥子 沼野	利佳 YOS		chiko NUMANO Rik	a	
alphabet mark]		1112 100			u .	
Numbering	ENV MAS53225					
Objectives of class						
Objective of class is to develop	a new technology	for deter	tion of u	neuronal function in	vour brain. We de	al with neuronal
property and development of neu	ronal circuit. and di	scuss appl	icability a	and problem of your i	ideas.	
Contents of class	,					
S Yoshida,						
(1)Properties of neuronal cells						
(2)Electrical function and ion trar	isport					
(3)Chemical information transport	t					
(4)Development of neuronal circu	it					
(5)Detection of chemical information	tion					
(6)Detection of electrical informa	tion					
(7)Detection of cortical developm	ient					
R Numano,						
(8)Neural inducer in vertebrates						
(9)Notch and Delta genes						
(10)Notch and Delta genes						
(11)Polarity and Segmentation						
(12)Polarity and Segmentation						
(13)Hox gene function in the nerv	vous system					
(14)Hox gene function in the nerv	vous system					
(15)Topic & Discussion						
Self Preparation and Review						
<b>D I I I I I I I I I I</b>						
Related subjects						
A firm understanding on fundame	ntal biochemistry a	nd thermo	dynamics	will be necessary.		
Web-based text will be distribute	d					
Web based text will be distribute	u.					
(Deference)						
(Reference) From Neuron To Proin 4th Ed. N	challe at al (Sinaw	2001)				
Notes for reference	choils et. al. (Sinaut	er, 2001)				
Casla to be estimat						
Goals to be achieved						
Evaluation of achievement						
Yoshida S.						
Short reports on Web; 40%, Term	report; 60%					
Numano						
Term report; 100%						
ての他						
Details of examination						

S Yoshida Room: B-406, E-mail:syoshida@ens.tut.ac.jp R Numano Room: G-407, E-mail:numano@tut.jp <b>Reference URL</b> https://lms.imc.tut.ac.jp <b>Office hours</b> Make an appointment by e-mail.	Other informati	n
Room: B-406, E-mail:syoshida@ens.tut.ac.jp R Numano Room: G-407, E-mail:numano@tut.jp <b>Reference URL</b> https://lms.imc.tut.ac.jp <b>Office hours</b> Make an appointment by e-mail.	S Yoshida	
R Numano Room: G-407, E-mail:numano@tut.jp Reference URL https://lms.imc.tut.ac.jp Office hours Make an appointment by e-mail.	Room: B-406, E	-mail:syoshida@ens.tut.ac.jp
Room: G-407, E-mail:numano@tut.jp Reference URL https://lms.imc.tut.ac.jp Office hours Make an appointment by e-mail.	R Numano	
Reference URL https://lms.imc.tut.ac.jp Office hours Make an appointment by e-mail.	Room: G-407, E	-mail:numano@tut.jp
https://lms.imc.tut.ac.jp Office hours Make an appointment by e-mail.	Reference URL	
<b>Office hours</b> Make an appointment by e-mail.	https://lms.imc	:ut.ac.jp
Make an appointment by e-mail.	Office hours	
	Make an appoin	ment by e-mail.

Key words

# (M44630140)Advanced Electrical and Electronic Technology for Ecological Engineering[Advanced Electrical and Electronic Technology for Ecological Engineering]

Subject name[English]	Advanced Electrical and Electronic Technology for Ecological Engineering[Advanced					
	Electrical and Electronic Technology for Ecological Engineering]					
Schedule number	M44630140	Subject area	Advanced	Required or	Elective	
		-	Environmental	elective		
			and Life			
			Sciences			
Time of starting a course	Spring1 term	Day of the	Fri.4~4	Credit(s)	1	
		week,period				
Faculty	Graduate Program	n for Master's Deg	ee	Subject grade	1~2	
Department Offered	Environmental an	d Life Sciences		Beggining	M1, M2	
Charge teacher name[Roman	田田 二郎, 尚島	, 和則, 有 古 誠 -	- 剧 IANAKA Saburo	, TAKASHIMA Kaz	unori, ARIYOSHI	
	ENV_WA3J422J					
I.Fundamentals of operational Ar	nplifiers					
2. Application circuits of operation	hai Amplifiers					
Centente of close	by Electronics.					
The textheck includes the follow	ng aubiaata:					
The textbook includes the follow	ing subjects.					
<b></b>						
1. Integrated circuit	,					
2. Ideal OP-Amp model and Lines	ar circuit					
3. Application technologies						
<b>B I I I I I I I I I I</b>						
Related subjects						
The knowledge of basic Electron	ics and mathematic	s is absolutely ne	cessary. If you have	not completed the	ese subjects, you	
are not qualified for this course.						
Notes for textbook						
Microelectronics Circuits and De	VICES DY Mark N. HO	prenstein.				
Notes for reference	5.					
Gaala ta ba aabiayad						
Goals to be achieved						
Evaluation of achievement						
Grades for the course will be bas	ed on the test sco	re, the report and p	resentation score.			
その他						
Other Details of exemination						
Decails of examination						
0.1 1 6						
	16 E	@ tt '				
Tanaka: Room: G-605, Phone: 69	16, E-mail: tanakas	ens.tut.ac.jp				
Reference URL						
http://ens.tut.ac.jp/squid/						
UTTICE NOURS						
Relations to attainment objective	es of learning and e	ducation				
環境·生命工学専攻						
(C)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、発展的にジ	舌用できる能力			

(F)最新の技術や社会環境の変化に対する探究心と持続的学習力 社会,環境,技術等の変化に対応して,生涯にわたって自発的に学習する能力

Key words

## (M44630190)Advanced Sustainable Coordinator[Advanced Sustainable Coordinator]

				0 1 . 1	
Subject name[English]	Advanced Sustai	nable Coordinator[A	dvanced Sustainable	Coordinator	<b>-</b>
Schedule number	M44630190	Subject area	Advanced	Required or	Elective
			Environmental	elective	
			and Life		
		<b></b>	Sciences	• • · · · ·	
Time of starting a course	Spring2 term	Day of the	Fri.4~4	Credit(s)	1
	0.1.5	week,period			1 0
Faculty	Graduate Progra	m tor Master's Degre	e	Subject grade	1~2
Department Offered	Environmental an	nd Lite Sciences		Beggining	M1, M2
Ohamma taaraha	市海井 老夫 エヘ			grade	
Unarge teacher name[Roman	宋冲林 孝辛   0 	AIRIN Takayuki			
alphabet markj					
Objectives of class					
Goto				•	
Io establish a "Sustainable Soc	ciety" is one of m	ajor tields for susta	inable development.	Countermeasures	tor it should be
comprehensive and they compris	e not only engineer	rıng but also several	disciplines. The obje	ctives of this class	are
1 to comprehend notion of "Sust	ainable Society"				
2 to learn human dimensional dis	ciplines for "Sustai	inable Society"			
3 to know planning method to est	tablish "Sustainabl	e Society´´ though e	kamples		
Tokairin					
The objectives of this class are					
1 to know air pollution situation					
2 to understand the evaluation m	ethod of pollutant	concentration			
3 to understand the characterist	ics of planetary bo	undary layer			
Contents of class					
Goto					
1 Concept of Sustainable develop	oment				
2 Material (Substance) flow analy	vsis and Life Cycle	Assessment			
3 Japanese environmental law an	id institution				
Tokairin					
1 Atmospheric environment and a	air pollution				
2 Atmospheric diffusion modeling					
3 Meteorology of planetary bound	dary layer				
Self Preparation and Review					
Related subjects					
Notes for textbook					
Goto					
L will distribute conies of decume	nt				
A win discribute copies of docume					
l okairin					
I will distribute copies of docume	nt.				
Notes for reference					
Goals to be achieved					
Goto					
to understant how to establish su	ustainable society				
	-				

#### Tokairin

to understand basics on atmospheric environment and its evaluation method.

## Evaluation of achievement

Every week and Term end report (100%)

Examination

#### By Report

# Details of examination

#### Other information

Naohiro Goto (G603) goto@ens.tut.ac.jp Takayuki Tokairin (G405) tokairin@ens.tut.ac.jp

#### Reference URL

Office hours

Any time by E-mail

Relations to attainment objectives of learning and education

## Key words

Sustainablity, MFA, LCA, Air pollution, planetary boundary layer, Atmospheric diffusion

# (M44630200)Advanced Supercritical Fluid Engineering[Advanced Supercritical Fluid Engineering]

Subject name[English]	Advanced Supercritical Fluid Engineering[Advanced Supercritical Fluid Engineering]					
Schedule number	M44630200	Subject	area	Advanced	Required or	Elective
		_		Environmental	elective	
				and Life		
	Sciences					
Time of starting a course	Spring2 term	Day o	f the	Fri.2~2	Credit(s)	1
Faculty	Graduate Program	n for Maste	er's Degr	ee	Subject grade	1~2
Department Offered	Environmental an	d Life Scie	nces		Beggining	M1. M2
					grade	
Charge teacher name[Roman	大門 裕之 DAIM	ON Hiroyul	ĸi			
alphabet mark]						
Numbering	ENV_MAS54125					
Objectives of class						
Based on Supercritical Fluid E	Engineering and E	nvironment	al Chen	nical Engineering, pr	ractical philosophy	, creativity and
leadership of engineer are impro	ved during this cou	irse. The	topics a	re mainly waste man	agement and utiliz	ation of biomass.
Environmental issue is widely dis	cussed to obtain th	e knowledg	ge and or	ganizing skill of comp	prehensive process	or society.
Based on Supercritical Fluid E	Engineering and E	nvironment	al Chen	nical Engineering, pr	ractical philosophy	, creativity and
leadership of engineer are impro	ved during this col	irse. The	topics ai	re mainly waste man	agement and utiliz	ation of biomass.
Contents of class	cussed to obtain th	e knowledg	ge and or	ganizing skill of comp	prenensive process	or society.
1 st Summany						
2nd History						
3rd Physical property 1						
4th Physical property 2						
5th Instrumentation and process	engineering					
6th Application of Supercritical W	later Technologies	1				
7th Application of Supercritical W	ater Technologies	2				
8th Application of Supercritical W	later Technologies	3				
9th Application of Supercritical W	later Technologies	4				
10th Application of Supercritical	Water Technologies	s 5				
11th Application of Supercritical	Carbon dioxide Teo	hnologies	1			
12th Application of Supercritical	Carbon dioxide Tec	hnologies :	2			
13th Application of Supercritical	Carbon dioxide Tec	hnologies	3			
14th Application of Supercritical	Carbon dioxide Tec	hnologies 4	4			
1 ot Summon						
2nd History						
3rd Physical property 1						
4th Physical property 2						
5th Instrumentation and process	engineering					
6th Application of Supercritical W	later Technologies	1				
7th Application of Supercritical W	later Technologies	2				
8th Application of Supercritical W	later Technologies	3				
9th Application of Supercritical W	later Technologies	4				
10th Application of Supercritical	Water Lechnologies	\$ 5				
12th Application of Supercritical	Carbon dioxide Teo	nnologies	ן ה			
13th Application of Supercritical	Carbon dioxide Tec	hnologies :	2 3			
14th Application of Supercritical	Carbon dioxide Tec	hnologies (	4			
15th Examination						
Self Preparation and Review						
<b>.</b>						
Related subjects		ا براده ا	I E I			
Advanced Analytical Separation	Chemistry, Advance	d Industria	u Ecology	/		
Notes for textbook	onemistry, Auvarice	a muustria		/		
1. Analytical Supercritical Fluid C	hromatography and	Extraction	า			
edited by M. L. Lee and K. E. Mar	kides, 1990					

Observation methods of the second sec
Chromatography Conference, Inc.
2. Hypnenated Techniques in Supercritical Fluid Chromatography and Extraction
edited by K. Jinno, 1992
Elsevier
1. Analytical Supercritical Fluid Chromatography and Extraction
edited by M. L. Lee and K. E. Markides, 1990
Chromatography Conference, Inc.
2. Hyphenated Techniques in Supercritical Fluid Chromatography and Extraction
edited by K. Jinno, 1992
Elsevier
Notes for reference
Goals to be achieved
1 To understand Supercritical Fluid Technology
2 To improve engineering skill
2. To obtain the knowledge about Environmental problem especially for waste management
1. To understand Supervisional Elivinoministra problem especially for waste management
2. To improve engineering skill
2. To hiprove engineering skii
5. To obtain the knowledge about Environmental problem especially for waste management.
Based on Presentation and Interview during class
More than
80% ; A
65% ; B
55% ; C
Based on Presentation and Interview during class
More than
80% ; A
65% ; B
55% ; C
Examination
レポートで実施
By Report
Details of examination
Other information
Office Builing G. Floor 6th Boom 602
Tel:0532-44-6905
Email/daimon@ens.tut.ac.in
Office : Builing G, Floor 6th, Room 602
Tel:0532-44-6905
Email:daimon@ens.tut.ac.jp
Reference URL
http://water.eco.tut.ac.jp/class.html (English version under construction)
http://water.eco.tut.ac.jp/class.html (English version under construction)
Office hours
After the class or anytime when you make an appointment through Email
After the class or anytime when you make an appointment through Email
Relations to attainment objectives of learning and education
(D)
Key words
Supercritical Fluids, Resource Recovery, Material and Energy Balance, Process Engineering
Supercritical Fluids, Resource Recovery, Material and Energy Ralance, Process Engineering

# (M44630220)Advanced Life Science and Biotechnology II[Advanced Life Science and Biotechnology II]

Subject name[English]	Advanced Life Science and Biotechnology II[Advanced Life Science and Biotechnology II]							
Schedule number	M44630220	Subject are	a	Advanced	Required or	Elective		
				Environmental	elective			
	and Life							
				Sciences				
Time of starting a course	Spring term	Day of week.period	the	Intensive	Credit(s)	2		
Faculty	Graduate Progra	m for Master's	Degr	ee	Subject grade	1~2		
Department Offered	Environmental an	nd Life Science	es		Beggining	M1, M2		
Charge teacher name[Roman	S4系教務委員 4	lkei kyomu Iin-	-S		grade			
Numbering	ENV_MAS53225							
Objectives of class								
This course will provide the stud	dents with the opp	ortunitv to stı	udv or	the selected subied	ct in the realm of	further advanced		
life science and biotechnology ba	ised on the knowle	dge of the cou	rse of	Advanced Life Scie	nce and Biotechno	logy I.		
Contents of class		0				0,		
The classes will be given by his/	her supervisor. The	type and con	tents	of this course depen	ld on his∕her super	visor.		
Self Preparation and Review								
Related subjects								
Advanced Life Science and Biote	echnology I							
Notes for textbook								
Notes for reference								
Goals to be achieved								
Evaluation of achievement								
The evaluation is based on the s	cores of reports. pr	resentations. a	ind ex	amination.				
Examination	• •	·						
None during exam period								
Details of examination								
Other information								
Supervisor								
Reference URL								
Office hours								
Students are encouraged visiting	by appointment.							
Relations to attainment objective	Relations to attainment objectives of learning and education							
Key words								
Molecular biology and microbiology, genomics, biotechnology and bioengineering								

# (M44630240)Advanced Environmental Technology II[Advanced Environmental Technology II]

Subject name[English]	Advanced Environmental Technology II[Advanced Environmental Technology II]							
Schedule number	M44630240	Subjec	st are	a	Advanced	Required or	Elective	
					Environmental	elective		
					and Life			
					Sciences			
Time of starting a course	Spring term	Day	of	the .	Intensive	Credit(s)	2	
E	Que du et a Due au	week,	beriod	1		Outlast must	10	
Faculty	Graduate Progra	am for ivia	ster s	Degre	ee	Subject grade	1~2 M1 M2	
Department Onered	Environmental a		sience	55		grade	WIT, WIZ	
Charge teacher name[Roman	S4系教務委員	4keikyom	nu Iin-	-S				
alphabet mark]								
Numbering	ENV_MAS54225							
Objectives of class								
This course will provide the stud	dents with the opp	oortunity	to sti	udy on	the selected subje	ct in the realm of	further advanced	
environmental technology based	on the knowledge	of the co	urse (	of Adv	anced Environmenta	l Technology I.		
Contents of class								
The classes will be given by his/	her supervisor. Th	e type an	d con	tents	of this course deper	d on his/her super	visor.	
Self Preparation and Review								
Related subjects								
Advanced Environmental Techno	logy I							
Notes for textbook								
Notes for reference								
Goals to be achieved								
Evaluation of achievement								
The evaluation is based on the s	cores of reports, p	oresentati	ons, a	and exa	amination.			
Examination								
None during exam period								
Details of examination								
Other information								
Supervisor								
Reference URL								
Office hours								
Students are encouraged visiting	by appointment.							
Relations to attainment objective	es of learning and	educatior	ו					
Key words								
	Key words							

# (M44630260)Advanced Environmental and Ecological Systems II[Advanced Environmental and Ecological Systems II]

Subject name[English]	Advanced Enviro	nmental and Ecolog	ical Systems II[Adva	anced Environment	al and Ecological				
	Systems II]								
Schedule number	M44630260	M44630260 Subject area Advanced Required or Elective							
	1111000200								
			and Life	0000140					
			Sciences						
Time of starting a course	Spring term	Day of the	Intensive	Credit(e)	2				
	opining certifi	week period	Intensive		2				
Faculty	Graduate Program	n for Master's Degre	20	Subject grade	1~2				
Department Offered	Environmental an	d Life Sciences		Beggining	M1 M2				
				grade					
Charge teacher name[Roman	S4系教務委員 4	kei kvomu lin-S		8					
alphabet mark]									
Numbering	ENV MAS54125								
Objectives of class	_								
This course will provide the stur	lents with the one	ortunity to study or	the selected subject	ct in the realm of	further advanced				
environmental and ecological su	istems hased on t	the knowledge of +	he course of Advan	aced Environment	al and Ecological				
Sveteme I	Scome Dased UN	LIG NIGWICUZE UN L	no course or Advar						
Contents of class									
The classes will be given by hig/l	or auporvioor The	turns and contants	of this course depen	d on his /hor ounou	nioor				
Solf Propagation and Paviow	ter supervisor. The	type and contents	or this course depen	iu on nis/ner super	visor.				
Sell Freparation and Review									
<b>—</b> • • • • •									
Related subjects									
Advanced Environmental and Eco	ological Systems I								
Notes for textbook									
Notes for reference									
Goals to be achieved									
Evaluation of achievement									
The evaluation is based on the so	cores of reports pr	resentations and ex	amination						
Examination									
None during exam period									
Details of examination									
Detaile of examination									
Other information									
Reference LIRI									
000 1									
Students are encouraged visiting	by appointment.	4							
Relations to attainment objective	es of learning and e	oducation							
Kauwanda									
ney words									

#### (M44630290)Advanced Biomaterials Engineering[Advanced Biomaterials Engineering]

Subject	Advanced Biomaterials Engineering[Advanced Biomaterials Engineering]							
name[English]					<b>.</b>	<b>E</b> ( ) (		
Schedule number	M44630290		Subject area	Advanced	Required or	Elective		
				and Life Sciences	elecuve			
Time of starting a course	Spring2 term	1	Day of the week,period	Thu.3~3	Credit(s)	1		
Faculty	Graduate Pro	ogram for Master's [	Degree		Subject grade	1~2		
Department Offered	Environment	al and Life Sciences	;		Beggining grade	M1, M2		
Charge teacher	辻 秀人,手	老 龍吾 TSUJI Hide	eto, TERO Ryugo	)				
name[Roman								
alphabet mark]								
Numbering	ENV_MAS52	225						
Objectives of class			<b>c</b> 1					
Biomaterials have bee	n developed a	and studied in tern	ns of various a	pplications including	biomedical, pha	rmaceutical and		
environmental application	ions. This cou	rse covers the fun	damentals and a	applications of biomat	erials and relat	ed experimental		
Contents of class								
This course deals with	all aspects of	f biobased and biode	egradable polyme	ers for biomedical ph	armaceutical, ar	nd environmental		
applications, and of de	evices and te	chniques for sensin	g biomolecules.	The detailed course	schedule is sh	own below. The		
detailed course schedu	le is shown be	low.	6					
Biobased and biodegrad	dable polymers	(Hideto Tsuji):						
(1) introduction, synthe	esis, and struc	tures, (2) molding,	crystallization, a	nd physical properties	s, (3) hydrolytic	degradation and		
biodegradation, and (4)	applications.		•			5		
Biodevice and biosensi	ng (Rvugo Tero	o):						
(5) introduction of biom	naterials and bi	iodevices, (6) detect	ion of cell memb	orane functions, (7) su	rface patterning	g and microarray,		
and (8) imaging techniq	ues for biomol	ecules.						
Self Preparation and R	eview							
If possible, read the re	ference book	chapters which are	shown below an	nd you can find them	in the universit	y library (Hideto		
Tsuji).								
Read the appropriate o	hapter(s) of th	ne reference book (	#3) shown below	. You can access it ir	n the university	network. (Ryugo		
lero)								
Related subjects								
N								
		1: J. t. T						
Printed materials will be	e distributed (r	s necessary (Ryugo	Tero)					
Reference1	Book title	Degradation of F	Poly (Lactide)-B	ased Biodegradable	ISBN	1604565020		
	Doon due	Materials			10011	100100020		
	Author	Hideto Tsuji	Publisher	Nova Science	Publish	2008		
				Pub Inc	year			
Reference2	Book title	Chapter 21 in	"Poly(lactic	acid): Synthesis,	ISBN	0470293667		
		Structures, Prope	rties, Processing	, and Applications"				
	Author	Hideto Tsuji	Publisher	Wiley	Publish	2010		
				<u> </u>	year			
Reference3	Book title	Nanoscience: Nan	obiotechnology a	nd Nanobiology	ISBN	978-3-540-		
		D				88633-4		
	Author	Patrick	Publisher	Springer	Publish	2009		
		Marcal Lohmon			year			
Notes for reference	I	marcer Lanmani	1	1	I			
Reference book 3 (Dur	go Tero).							
http://link.springer.com	so rero). 1/hook/10.100	7%2F978-3-642-280	30-6					
Goals to be achieved	., 2001, 10.100							

To understand the fundamentals and applications of biobased and biodegradable polymers (Hideto Tsuji).
To understand the fundamentals and applications of biodevice, biosensing and related methods (Ryugo Tero).
Evaluation of achievement
Presentation (100%) regarding the biobased and biodegradable polymers (Hideto Tsuji)
Reporting assignment (100%) which will be given in each class (Ryugo Tero)
Examination
その他
By Report
Details of examination
Presentation (Hideto Tsuji)
Reporting assignment (Ryugo Tero)
Other information
Room (G-606), e-mail (tsuji@ens.tut.ac.jp), phone: 6922 (Hideto Tsuji)
Room (B-405), e-mail (tero@tut.jp), phone: 6791 (Ryugo Tero)
Reference URL
Office hours
Immediately after the class (Hideto Tsuji)
After the class, or as needed in my office (Ryugo Tero)
Relations to attainment objectives of learning and education
Key words

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

	<u> </u>					
Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil					
	Engineering I					
Schedule number	M45610010	Subject area	Advanced	Required or	Required	
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Voor	Day of the	Intensive	Credit(a)	3	
Time of starting a course	i cai		Incensive	Oreun(a)	5	
	0 I I D	week,period			1.0	
Faculty	Graduate Progra	am for Master's Degre	ee	Subject grade	1~2	
Department Offered	Architecture an	d Civil Engineering		Beggining	M1, M2	
				grade		
Charge teacher name[Roman	S5系教務委員	5kei kyomu Iin-S				
alphabet mark]						
Numbering						
All the students are required to	attend all the ser	minars, which is arrar	nged by the laborate	ory supervisor for	the special study	
subjects related to the current re	esearch activity of	f the laboratory. The	scheduled program	of the seminars is a	announced by the	
supervisor at the guidance of the	seminar.					
Contents of class						
Self Preparation and Review						
Related subjects						
·····						
Notes for textbook						
Notes for reference						
Goals to be achieved						
Evaluation of aphievement						
Report						
Examination						
その他						
By Report						
Details of examination						
Other Information						
Reference URL						
Office have						
Office nours						
Relations to attainment objectives of learning and education						
1						
Key words						

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

	Engineering II]					
Schedule number	M45610020	Subject area	Advanced	Required or	Required	
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	3	
		week,period				
Faculty	Graduate Progr	am for Master's Degr	ee	Subject grade	2~2	
Department Offered	Architecture an	nd Civil Engineering		Beggining	M2	
				grade		
Charge teacher name[Roman	S5系教務委員	5kei kyomu Iin-S				
alphabet mark]						
Numbering						
Objectives of class						
All the students are required to	attend all the se	minars, which is arra	nged by the laborate	ory supervisor for	the special study	
subjects related to the current re	search activity o	f the laboratory. The	scheduled program	of the seminars is a	announced by the	
supervisor at the guidance of the	seminar.					
Contents of class						
Self Preparation and Review						
Pelated subjects						
Notes for textbook						
Notes for reference						
Goals to be achieved						
Evaluation of achievement						
Report						
Examination						
その他						
By Report						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
Key words						

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

Subject name[English]	Thesis Researc	h on Architecture and	Civil Engineering	hesis Research on	Architecture and		
	Civil Engineering]						
Schedule number	M45610030	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Required		
Time of starting a course	2Years	Day of the week.period	Intensive	Credit(s)	6		
Faculty	Graduate Progr	am for Master's Degre	e	Subject grade	1~		
Department Offered	Architecture an	d Civil Engineering		Beggining grade	M1, M2		
Charge teacher name[Roman alphabet mark]	S5系教務委員	,5系各教員 5kei kyoi	mu Iin−S, 5kei kakuk	xyouin			
Numbering							
Objectives of class							
This thesis research on architect	ture and civil engi	neering is designated	to deepen the know	wledge and enhanc	e the skills of the		
students in their research fields t	brough the self-	riented endeavour wi	th the instruction of	f his/her superviso			
Contents of class		nienteu enueavour wi			1(5).		
The subjects and the contents of	of the thesis van	depending on the la	horatory All studer	its must present +	heir thesis at the		
end of the course and take a fir	al examination or	the thesis as a rea	uirement for the gr	aduation of the m	aster course The		
study for the thesis is planned ar	id conducted und	er the guidance of the	supervisor(s)				
Self Preparation and Review							
Related subjects							
TBD by the laboratory							
Notes for textbook							
TBD by the laboratory							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
This credit is assigned for all the	process for the p	preparation and prese	ntation of the thesis	5.			
Examination							
その他							
By Report							
Details of examination							
Other information							
Refer to administration office.							
Reference URL							
Refer to the URL of each laboratory							
Office hours							
Refer to administration office.							
Relations to attainment objectives of learning and education							
Key words							

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

Subject name[English]	Thesis Research	on Architecture and	Civil Engineering[T	hesis Research on	Architecture and	
	Civil Engineering]					
Schedule number	M45610030	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Required	
Time of starting a course	2Years	Day of the week.period	Intensive	Credit(s)	6	
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	1~2	
Department Offered	Architecture and	d Civil Engineering		Beggining grade	M2	
Charge teacher name[Roman alphabet mark]	S5系教務委員	5kei kyomu Iin-S				
Numbering	ARC_MAS51025					
Objectives of class						
This thesis research on architect	ure and civil engin	neering is designated	to deepen the know	vledge and enhanc	e the skills of the	
students in their research fields t	hrough the self-o	riented endeavour wi	th the instruction of	his/her superviso	r(s).	
Contents of class						
The subjects and the contents of	of the thesis vary	depending on the la	boratory. All studen	ts must present tl	heir thesis at the	
end of the course and take a fir	al examination on	the thesis, as a req	uirement for the gr	aduation of the ma	aster course. The	
study for the thesis is planned ar	id conducted unde	er the guidance of the	e supervisor(s).			
Self Preparation and Review						
Related subjects						
IBD by the laboratory						
Notes for reference						
Goals to be achieved						
Evaluation of achievement						
This credit is assigned for all the	process for the p	reparation and presei	ntation of the thesis	•		
Examination この世						
ての他 By Report						
Details of examination						
Other information						
Refer to administration office.						
Refer to the URL of each laboratory						
Pafer to administration office						
Refer to administration office.						
	o or rourning allu					
Key words						

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and						
	Civil Engineering]						
Schedule number	M4561003T	Subject area	Advanced	Required or	Required		
			Architecture	elective			
			and Civil				
			Engineering				
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6		
		week,period					
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~2		
Department Offered	Architecture and	d Civil Engineering		Beggining	M2		
				grade			
Charge teacher name[Roman	S5系教務委員	5kei kyomu Iin-S					
alphabet mark]							
Numbering							
Objectives of class							
This thesis research on architect	ture and civil engin	neering is designated	to deepen the know	vledge and enhanc	e the skills of the		
students in their research fields t	through the self-o	riented endeavour wi	th the instruction of	his/her superviso	r(s).		
Contents of class				·			
The subjects and the contents of	of the thesis vary	depending on the la	boratory. All studen	ts must present t	heir thesis at the		
end of the course and take a fir	al examination on	the thesis, as a req	uirement for the gr	aduation of the ma	aster course. The		
study for the thesis is planned ar	nd conducted unde	r the guidance of the	e supervisor(s).				
Self Preparation and Review							
Related subjects							
Notes for touth cale							
NOTES FOR TEXTDOOK							
Notes for reference							
Goals to be achieved							
Evaluation of achievement							
This credit is assigned for all the	process for the p	reparation and prese	ntation of the thesis				
Examination				•			
By Report							
Details of examination							
Other information							
Defer to administration office							
Refer to administration office.							
	ory						
Office hours							
Reter to administration office.							
relations to attainment objective	s of learning and	education					
Kov words							
Ney words							

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

Subject name[English]	Seminar on A	robitacture and Ci	vil Engineering[Ser	ninar on Archite	ature and Civil	
	Engineering[Seminar of Architecture and Givi Engineering[Seminar of Architecture and Givi					
Cabadala availa		Out the set of the	A duran a u d	De audue d	De milios 1	
Schedule number	M45610040	Subject area	Advanced	Required or	Required	
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6	
-		week period				
Faculty	Graduate Progra	am for Master's Degre	20	Subject grade	2~2	
Department Offered	Architecture an	d Civil Engineering		Beggining	L L M2	
	Architecture and			Doggining	IVIZ	
	or 자 봐 깡 チ 문	<u></u>		grade		
Charge teacher namelkoman	55 杀 软 務 安 貝	okei kyomu lin-5				
alphabet mark						
Numbering						
Objectives of class	Į.					
	مغغمهما والعامم	nineus udaiele is europ	and by the labourt		the encoded study	
All the students are required to	attend all the ser	minars, which is arran	iged by the laborate	bry supervisor for	the special study	
subjects related to the current re	esearch activity of	the laboratory. The	scheduled program	of the seminars is a	announced by the	
supervisor at the guidance of the	seminar.					
Contents of class						
In each seminar, students purs	sue several resea	arch topics and/or	undertake projects	collectively and	solely under the	
instruction of the faculty member	rs of the departme	ent and/or those of o	ther departments.			
Self Preparation and Review	•					
_						
Related subjects						
Notes for textbook						
Notes for textbook						
Notes for reference						
Coole to be achieved						
Goals to be achieved						
Evaluation of achievement						
Report						
Evamination						
By Depart						
By Report						
Details of examination						
Other information						
Reference URL						
Relations to attainment objectives of learning and education						
1						
Key words						

(M45630130)Advanced Study on Housing System and Housing Policy[Advanced Study on Housing System and Housing Policy]

Subject name[English]	Advanced Study on Housing System and Housing Policy[Advanced Study on Housing					
	System and Housing Policy]					
Schedule number	M45630130	Subject area	Advanced	Required or	Elective	
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Spring term	Day of the	Tue.2~2	Credit(s)	2	
		week,period				
Faculty	Graduate Progra	m for Master's Degre	ee	Subject grade	1~2	
Department Offered	Architecture and	Civil Engineering		Beggining	M1, M2	
				grade		
Charge teacher name[Roman	松島 史朗 MATS	SUSHIMA Shiro				
alphabet mark]						
Numbering						
UDJECTIVES OF CLASS						
Contents of class						
Self Preparation and Review						
Delete di suble ste						
Notes for textbook						
Notes for reference						
Goole to be echieved						
Goals to be achieved						
Evaluation of achievement						
Examination						
Details of examination						
Uther information						
Reference URL						
Office hours						
Polations to attainment objectives of learning and advection						
	S UI IDAITIIII B AIIO E					
Kasarah						
Key words						

## (M45630200)Advanced Structural System Planning and Design II[Advanced Structural System Planning and Design II]

Subject name[English]	Advanced Structural System Planning and Design II[Advanced Structural System Planning					
	and Design II	1	1	1	1	
Schedule number	M45630200	Subject area	Advanced	Required or	Elective	
			Architecture	elective		
			and Civil			
			Engineering			
Time of starting a course	Spring term	Dav of the	Intensive	Credit(s)	2	
		week period				
Faculty/	Graduate Progr	am for Master's Degr	20	Subject grade	1~2	
Department Offered	Architecture an	d Civil Engineering		Beggining	M1 M2	
Department Onered	Architecture and			Doggining	1011, 1012	
Obarra da a barra da a a Construction	05 亚	Fluct Income the C		grade		
Charge teacher name_koman	55米软粉安貝	okei kyömu lin-S				
alphabet mark						
Numbering						
Objectives of class						
It depends on the laboratory T	he resistered stu	udents are required	to attend all the s	eminars, which is	arranged by the	
laboratory supervisor for the spe	nial study subjec	ts related to the cur	rent research activi	ty of the laborator	w The scheduled	
aboratory supervisor for the spe			of the cominent		y. The scheduled	
Program of class	nced by the supe	rvisor at the guidance	e or the seminar.			
Contents of class						
Self Preparation and Review						
-						
Delete d and in the						
Related subjects						
Notes for textbook						
Notes for reference						
Goals to be achieved						
Freehouting of a discourse of						
Evaluation of achievement						
Examination						
By Report						
Details of examination						
Docald of Oxalimation						
Other information						
Reference URL						
Office hours						
Relations to attainment objectives of learning and education						
Key words						
1						

(M45630220)Advanced Environm	antal System Planning and Design II[Advanced	Environmental System Planning and Design II]

Subject name[English]	Advanced Envir	ronmental System Pl	anning and Design	II[Advanced Envi	ronmental System
	Planning and Design II]				
Schedule number	M45630220	Subject area	Advanced	Required or	Elective
			Architecture	elective	
			and Civil		
			Engineering		
Time of starting a course	Spring term	Day of the	Intensive	Credit(s)	2
		week,period			
Faculty	Graduate Progr	am for Master's Degre	ee	Subject grade	1~2
Department Offered	Architecture an	d Civil Engineering		Beggining grade	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員	5kei kyomu Iin-S			
Numbering					
Objectives of along					
It depends on the laboratory T	be resistand at	udente are required	to attend all the a	aminara which is	arranged by the
It depends on the laboratory. I	ne resistered st	udents are required	to attend all the s	eminars, which is	arranged by the
laboratory supervisor for the spe		us related to the cur	rent research activi	ty of the laborato	ry. The scheduled
Contents of class	inceu by the supe	i visor at the guidance	on the seminar.		
Contents of class					
Solf Dresseration and Deview					
Self Preparation and Review					
<b>B</b> 1 1 1 1					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Examination					
By Report					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and	education			
Key words					

## (M45630240)Advanced Regional System Planning and Design II[Advanced Regional System Planning and Design II]

Subject name[English]	Advanced Regio	onal System Planning	and Design II[Adva	nced Regional Syst	em Planning and
Schedule number	M45630240	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Progra	am for Master's Degr	ee	Subject grade	1~2
Department Offered	Architecture an	d Civil Engineering		Beggining grade	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員	5kei kyomu Iin−S			
Numbering					
Objectives of class	L				
It depends on the laboratory T	he resistered st	udents are required	to attend all the s	eminars, which is	arranged by the
laboratory supervisor for the spe	cial study subject	ts related to the cur	rent research activit	tv of the laborator	v. The scheduled
program of the seminars is appou	inced by the supe	rvisor at the guidance	e of the seminar		y. The solication
Contents of class		TVISOF de trio guidarios			
Self Preparation and Review					
Related subjects					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Examination					
By Report Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and	education			
Key words					

(M45630340)Building science:Thermal Environment and vernacular architecture[Building science:Thermal Environment and vernacular architecture]

Subject name[English]	Building science:Thermal Environment and vernacular architecture[Building science:Thermal						
	Environment and vernacular architecture]						
Schedule number	M45630340	Subject area	Advanced	Required or	Elective		
			Architecture	elective			
			and Civil				
			Engineering				
Time of starting a course	Spring term	Day of the	Wed.2~2	Credit(s)	2		
		week,period					
Faculty	Graduate Program for Master's Degree			Subject grade	1~2		
Department Offered	Architecture and Civil Engineering			Beggining	M1, M2		
			grade				
Charge teacher name[Roman	都築 和代 TSUZUKI Kazuyo						
alphabet mark]							
Numbering							
Objectives of class							

#### **Objectives of class**

This course deals with the latest trend of research and development on prediction of indoor environment to ensure safe, reliable and comfortable quality of life, and to design a sustainable building. Also, the comprehensive assessment system for built environment efficiency will be lectured. Moreover, it also enhances the point of view, field of view and perspective to pursue built environments surround by us such as habitant, building, reginal/urban and global environments, and the objective is to cultivate an ability to tackle complex environmental issues. Simultaneously, this course aims to understand social requests and the ability required for environment and building services designs in buildings and cities.

#### Contents of class

The contents are as follows:

- 1. Actual situations of environmental impact to global environment affected by buildings and cities
- 2. Environmental impact evaluation affected by buildings and cities
- 3. LCA evaluation of buildings and cities
- 4. Comprehensive assessment system for built environment efficiency
- 5. Sustainable buildings
- 6. Eco city
- 7. Adaptive thermal comfort 1
- 8. Adaptive thermal comfort 2
- 9. Building science: Thermal Environment and vernacular architecture 1
- 10.Building science: Thermal Environment and vernacular architecture 2
- 11.Guidelines, codes and standard
- 12. Research and Development on thermal environment
- 13. Research and Development on IAQ
- 14. Discussion on IAQ related issues
- 15. Supplementary lecture

#### Self Preparation and Review

#### **Related subjects**

Building climate design, Building services design

Notes for textbook

Hand-outs related this course will be distributed.

## Notes for reference

#### Goals to be achieved

#### **Evaluation of achievement**

The grades will be evaluated by comprehensive consideration based on discussion (30%) and reports (70%) in the course.

[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 70 % of goals and obtained total points of reports, 65 or higher (out of 100 points).

C: Achieved 60 % of goals and obtained total points of reports, 55 or higher (out of 100 points).

#### Examination

By Report			
Details of examination			
Other information			
Phone: ext. 6839, Ema	l: ktsuzuki@ace.tut.ac.jp		
Reference URL			
Office hours			
K.tsuzuki: Monday, 15:	00-17:00		
Relations to attainment	t objectives of learning and	education	
Key words			

# (M45630350)Water Environment Engineering[Water Environment Engineering]

Subject name[English]	Water Environment Engineering[Water Environment Engineering]							
Schedule number	M45630350 Subject area Advanced		Advanced	Required or	Elective			
			Architecture	elective				
				and Civil				
				Engineering				
Time of starting a course	Spring term	Day of week.period	the	Fri.3~3	Credit(s)	2		
Faculty	Graduate Progran	n for Master's	Degre	ee	Subject grade	1~2		
Department Offered	Architecture and	Civil Engineer	ing		Beggining	M1. M2		
•		0	0		grade			
Charge teacher name[Roman	井上 隆信 INOU	E Takanobu						
alphabet mark]								
Numbering								
Objectives of class								
To know and understand the wate	ar quality change in	anvironment	and tr	eatment system				
To know and understand the wate	er quality change in	ent		cadificite system.				
Contents of class	or quality managem	one.						
Water pollutants and management	ŀ							
1-2 environmental standard	-							
3-5 nutrients organic matter								
6-7 chemicals in water environ	ment							
drinking water treatment and was	te water treatment	:						
8-9 rapid sand filtration proces	s							
10-11 activated sludge treatmen	t process							
water quality change in environme	ent and treatment s	system						
12 fundamental equation of the	mass balance	by oconn.						
13 piston flow model								
14 complete mixing model								
15 reaction rate								
Self Preparation and Review								
<b></b>								
Related subjects								
Notes for textbook								
No textbook is required for this c	lass.							
Notes for reference								
Goals to be achieved								
To understand the water pollutior	n and environmenta	I quality stand	lard.					
Evaluation of achievement								
[Evaluation basis] Students who a	attend all classes w	/ill be evaluate	ed as f	ollows:				
A: Achieved all goals and obtained total points of reports and presentation. 80 or higher (out of 100 points).								
B: Achieved 65 % of goals and obtained total points of reports and presentation, 65 or higher (out of 100 points).								
C: Achieved 55 % of goals and obtained total points of reports and presentation, 55 or higher (out of 100 points).								
Examination								
By Report								
Details of examination								
Other information								
Deference UDI								
Wednesday 12:00- 13:00								
Relations to attainment objectives of learning and education								

Key words