# Syllabus

# International Master's Degree Program (2021-Fall Term)

(M40030030)Culture and Communication I[Culture and Communication I]

Subject name[English]	Culture and Con	nmunication I[Culture	and Communicat	ion I]	
Schedule number	M40030030	Subject area	General	Required or	Elective
			courses	elective	
Time of starting a course	Fall term	Day of the	Thu.1~1	Credit(s)	2
		week,period			
Faculty	Graduate Progra	am for Master's Degre	ee	Subject grade	1~
Department Offered	Mechanical En	ngineering, Architec	ture and Civil	Beggining grade	M1
	Engineering, El	ectrical and Electr	onic Information		
	Engineering, Co	omputer Science	and Engineering,		
	Applied Chemist	ry and Life Science			
Charge teacher name[Roman	浅井 良策 ASA	I Ryosaku			
alphabet mark]					
Numbering	GEN_LIB51025				
Objectives of class					
This course aims to see how o	ur way of the und	lerstanding the world	l or our culture i	s reflected in the m	neaning of word
phrases, and grammatical constru	uctions, though lear	rning about the funda	mental concepts	of Cognitive Linguist	ics.
Contents of class		Ŭ.	·	<u> </u>	
If there is any changes about a c	lass schedule, it wi	ill be informed via Go	ogle Classroom o		STEM
In there is any changes about a c	ass solicule, it wi				
	(on-demand)				
Week 2 Encyclopedic meaning (1)					
Week 3 Encyclopedic meaning (2)	(on-demand)				
Week 4 Categorization and Proto	type (1) (on-dema	and)			
Week 5 Categorization and Proto	type (2) (on-dema	and)			
Week 6 Figurative Expressions (1	) (on-demand)				
Week 7 Figurative Expressions (2	) (on-demand)				
Week 8 Polysemy (1) (on-demar	id)				
Week 9 Polysemy (2) (on-demar	(d)				
Week 10 Polysemy (3) (on-demar					
Week 11 Idioms and Construction					
Week 12 Argument Structure Co		-demand)			
Week 13 Argument Structure Co					
Week 14 Argument Structure Co					
-		r-demand)			
Week 15 General Overview (on-	Jemand)				
If there will be any changes regar					
Preventing the Spread of Corona	virus, the course	content and evaluation	on of achievement	are subject to chan	ge.
Self Preparation and Review					
Review the learning contents of e	each lecture (90 mi	inutes) and prepare f	or the next class	(90 minutes).	
Related subjects					
特になし					
N⁄A					
Notes for textbook					
The teacher will provide all mater	ials for this course	Э.			
Notes for reference					
N/A					
Goals to be achieved					
To develop the skill of conducting	a cognitive-lingui	stic analysis of the o	ollected data		
		-		20011200	
To become more aware of the re	acionship between	the world knowledge	(or culture) and I	anguage.	
Evaluation of achievement					
Evaluation:	P 1 11 7		. /=0%		
Students will be evaluated accord	Jing to the term pa	aper (50%) and assign	ments (50%).		
Evaluation based on the describe	d comprehensively	<i>'</i> .			
Evaluation standard:					
	ing principles with	full attendance to a d	lass.		
Evaluation is based on the follow				full achievements of	the goal.
Evaluation is based on the follow S: More than 90 points (among	100) of the term p	oaper, assignments, p	resentations with		-
Evaluation is based on the follow S: More than 90 points (among A: More than 80 points (among	100) of the term p 100) of the term p	oaper, assignments, p oaper, assignments, p	resentations with resentations with	90% achievements o	f the goal.
Evaluation is based on the follow S: More than 90 points (among	100) of the term p 100) of the term p 100) of the term p	oaper, assignments, p oaper, assignments, p oaper, assignments, p	resentations with resentations with resentations with	90% achievements o 80% achievements o	f the goal. f the goal.

ixamination >ポートで実施 By Report Details of examination J/A
By Report Details of examination N/A
Details of examination I/A
I/A
)they information
Other information
Reference URL
Office hours
lease contact me or make an appointment by e-mail.
Relations to attainment objectives of learning and education
<b>幾械工学専攻</b>
A)幅広い人間性と考え方
し間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能
りを身につけている。
官気·電子情報工学専攻
A)幅広い人間性と考え方
し間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能
りを身につけている。
青報·知能工学専攻
A)幅広い人間性と考え方 1.開始会を地球的な視点からを否めによらえてグローバルな感性を持た、1.開上自然上の共生、ひせの短地について考える地
し間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち,人間と自然との共生,公共の福祉について考える能 りを身につけている。
な用化学・生命工学専攻
A)幅広い人間性と考え方
し間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能
りを身につけている。
<b>主築・都市システム学専攻</b>
A)幅広い人間性と考え方
し間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能
りを身につけている。
araduate Program of Mechanical Engineering for Master's Degree
A) Personality and outlook with a broad perspective
lave an international mindset to see human society from various angles with a global perspective; and the ability to consider
he symbiosis between humans and nature as well as publicwelfare
araduate Program of Electrical and Electronic Information Engineering for Master's Degree
A) Personality and outlook with a broad perspective
lave an international mindset to see human society from various angles with a global perspective; the ability to consider the
ymbiosis between humans and nature as well as publicwelfare
Araduate Program of Computer Science and Engineering for Master's Degree
A) Personality and outlook with a broad perspective lave an international mindset to see human society from various angles with a global perspective; and the ability to consider
lave an international mindset to see human society from various angles with a global perspective; and the ability to consider he symbiosis between humans and nature as well as publicwelfare
araduate Program of Applied Chemistry and Life Science for Master's Degree
A) Personality and outlook with a broad perspective
lave a mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis
etween humans and nature as well as public welfare
araduate Program of Architecture and Civil Engineering for Master's Degree
A) Personality and outlook with a broad perspective
lave an international mindset to see human society from various angles with a global perspective; and the ability to consider
he symbiosis between humans and nature as well as publicwelfare
Key words
inguistics, way of understanding the world, culture

(M40030090)Principles of Japanese Gram	nar[Principles of Ja	panese Grammar]
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	Japanese Grammar[Principles o	-	_		
Subject name[English]	Principles of Japanese Gramma			<b>_</b>	
Schedule number	M40030090	Subject area	General courses	Required or elective	Elective
Time of starting a course	Fall term	Day of the week,period	Thu.1~1	Credit(s)	2
Faculty	Graduate Program for Master's			Subject grade	1~
Department Offered	Mechanical Engineering, Arc Electrical and Electronic Ir Science and Engineering, Applie	nformation Engir	<b>.</b>	Beggining grade	M1
Charge teacher name[Roman alphabet mark]	吉村 弓子 YOSHIMURA Yumik	0			
Numbering	GEN_LIB51425				
Objectives of class					
	de an opportunity to understand on grammar, students will not lea				
English, and progress rapi	dly.				
Contents of class					
	llowing lessons in textbook on−de ning contents on Google Classro			-	
	mand)Introduction to the course , and interrogative sentence	e and general feat	ures of Japanese, L1	: Copula, Partic	le "wa" [topic],
Week 02 Oct.14 (On-de	mand)L2 and 3: Demonstratives	and Particle "no	[possession]		
	mand)L4 and 5: Verbs, Tense(n nsportation], and "to" [cooperation]		t), Particle "ni" [time	e], "kara [start],	"made" [goal]
Week 04 Oct.28 (On-de	mand)L6 and 7; Particle ″o″ [ob	oject], ″de″ [place	][means], ″ni″ [goal]	[source]	
Week 05 Nov.04 (On-de	mand)L8: Adjectives, L 9: Partic	le ″ga″[object]			
Week 06 Nov.11 (On-de	mand) L10: Existence, L11: Num	nerals and Counte	r suffixes		
Week 07 Nov.18 (On-den	nand) L12: Past tense of adjectiv	es, L13: Adjective	es of Desire		
Week 08 Dec.02 (On-de	mand) L14 and 15: Verb groups, ′	"te"-form of verb	s, and Sentences usi	ng "te"-form	
Week 09 Dec.09 (On-de	mand) L16: Sentences using "te"	′−form, L17: ″nai″	-form of verbs		
Week 10 Dec.16 (On-de	mand)L18: Dictionary form of ve	erbs, L19: "ta"-fo	rm of verbs		
Week 11 Jan.06 (On-de	mand) L20: Polite and plain style,	L21: Indirect spe	ech		
Week 12 Jan.13 (On-de	mand) L22: Noun modification				
Week 13 Jan.20 (On-de	mand) L23: Complex sentence us	ing ″toki″[when],			
Week 14 Jan.27 (On-de	mand) L24: Give and receive thing	gs or benefits			
Week 15 Feb.10 (On-de	mand) L25: Conditional mood				
Week 16 Feb.17 (Remot	e simultaneous interactive/On-de	emand) Exam			

						I
If there will be any chang	roo rogording Ta	wahaahi Universit	w of Toobpolog	Activity Postrictions	l aval far	
Preventing the Spread of		-				
If there is any changes a						
Self Preparation and Rev	-	fieddie, it will be i				
Read the respective part		ok for around 90 r	minutes each in	advance		
Understand and memoriz					e for the quiz	
Related subjects						
"Basic Grammar 1" of no	on-credit cours	e ″Basic Japanes	e″ will cover E	vercise A and B of the	main textbook.	
Textbook1	Deals	Minne ne Nile	ener (Element	and language I and	ISBN	978-4-
Iextbooki	Book title		-	ary Japanese I, 2nd mmar Notes-English,	ISBN	88319-629-6
		Romanized Ver		minar notes-English,		00319-029-0
	Author		Publisher	3A Corporation	Publish year	2013
	Autioi		Fublisher	on corporation	r ublish year	2010
Notes for textbook	1)     0)	c.i.		0) (1) 1) 1)		
Each lesson consists of	-			, 3)useful words and inf	formation, and 4)	grammar notes.
1)Vocabulary and 4)gram	mar notes only	will be taught in t	ne course.			
Notes for reference						
N/A						
Goals to be achieved						
At the end of this course						
1) to know pronunciation	-			- hudana i		
2) to understand pronunc				abulary.		
3) to grasp an overview o	of elementary Ja	apanese grammar	•			
Evaluation of achievement		<b>CO</b> 1/				
Grading Policy: Quizzes 4	40%, Final exam	60%				
Evaluation Criteria: Stud		required attendar	nce will be evalu	uated as follows by the	total points (ou	t of 100 points)
obtained from what show	n above:					
S: 90 or higher						
A: between 80 and 89						
B: between 70 and 79						
C: between 60 and 69						
<b>F</b>						
Examination 定期試験を実施(オンラ・	( ) )					
正朝武殿を美旭(オン) Examination(On line)	12)					
Details of examination						
N/A						
Other information						
When you contact by e-r	mail write ″[vou	r name] of Princi	ples of Japanes	se Grammar <sup>″</sup> at the sub	piect	
Reference URL						
N/A						
Office hours						
Office Hour						
Friday 11:00-12:00						
By appointment 08:30-12	2:00, 13:30-16:3	0 on weekday will	be also availab	le.		

Relations to attainment objectives of learning and education

機械工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 電気·電子情報工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 情報·知能工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 応用化学·生命工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 建築・都市システム学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 Graduate Program of Mechanical Engineering for Master's Degree (A) Personality and outlook with a broad perspective Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare Graduate Program of Electrical and Electronic Information Engineering for Master's Degree (A) Personality and outlook with a broad perspective Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as publicwelfare Graduate Program of Computer Science and Engineering for Master's Degree (A) Personality and outlook with a broad perspective Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare Graduate Program of Applied Chemistry and Life Science for Master's Degree (A) Personality and outlook with a broad perspective Have a mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as public welfare Graduate Program of Architecture and Civil Engineering for Master's Degree (A) Personality and outlook with a broad perspective Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare Key words elementary Japanese, grammar

#### (M40030100)Japanese Industrial Technologies and Innovations[Japanese Industrial Technologies and Innovations]

-	Innovations]					
Schedule number	M40030100	Subject area	General	Required or	Elective	
			courses	elective		
Time of starting a course	Fall term	Day of the	Intensive	Credit(s)	2	
		week,period				
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~	
Department Offered	Mechanical Eng	ineering, Architec	ture and Civil	Beggining	M1	
	Engineering, Elec	strical and Electr	onic Information	grade		
	Engineering, Cor	nputer Science a	and Engineering,			
	Applied Chemistry	and Life Science				
Charge teacher name[Roman	中内 茂樹,作井	康司,齊藤 大樹,	大和 真樹,鈴木	幸太郎,角田 正	也,小林 メイ,高	
alphabet mark]	野靖,入山恭彦,和田耕一,小林真一,松本雅行,丹埜段 NA					
	SAKUI Koji, SAITOH Taiki, OHWA Masaki, SUZUKI Koutarou, KAKUTA Masaya, KOBAYASHI					
	Mei, TAKANO	Yasushi, IRIYAMA	Takahiko, WAD	A Koichi, KOBA	YASHI Shinichi,	
	MATSUMOTO Ma	sayuki, TANNO Dar	1			
Numbering	COM_MAS51025					

In this series of lectures, the excellent experts of our university and Japanese leading companies from variety of fields in engineering impart to the engineering students knowledges of superior industry technologies in Japan. Students learn advantages and its contribution factors of Japanese industrial technologies.

\* International students dispatched by JICA Students Program(JICA-DSP) including ABE, Innovative ASIA and PEACE in 2020should take this subject as a compulsory course.

#### **Contents of class**

1. SAKUI Koji: Flash Memory changing the world culture from iPhone to Google

2~4. SAITO Taiki: Earthquake and Tsunami Disaster Mitigation

- Techniques
- 5. OHWA Masaki(1st): Current Status and Hurdle of Pharmaceutical R&D
- in Japan

6. SUZUKI Koutarou: Information Security Technology and its

Standardization

7. KAKUTA Masaya: Industry Technology from the design point of view

8. KOBAYASHI Mei: Landing a Job that Fits Your Lifestyle: tips for

finding, applying and interviewing

9. TAKANO Yasushi: Environmental noise of Railways

10. OHWA Masaki(2nd): Innovation in Japanese Chemical Industry -

Electronic Materials

11. IRIYAMA Takahiko: Recent developments of high-performance permanent magnets and their application

12. TANNO Dan: My life as an Interpreter -Bicultural Freedom-

13. WADA Koichi: Technologies and Innovations in Pharmaceutical

Industries

14.KOBAYASHI Shinichi: Electric Power Generation and Distribution

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in Japan
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15. MATSUMOTO Masayuki: Safe and stable transportation of the Shinkansen

supported by Signaling system

Self Preparation and Review

N/A Related subjects

N/A

Notes for textbook

N/A

#### Notes for reference

N/A

Goals to be achieved

1) To understand Japanese superior industrial technologies

2) To contributing factors of industrial technologies in Japan showing specific technologies covered by lectures

3) To analyze advantages of application of science and technology on production process in Japanese manufacturing

<b>Evaluation of achievement</b> Evaluation method scoring will be processed by sum of each report evaluation.
Evaluation method scoring will be processed by sum of each report evaluation
Evaluation criteria
Students who attend all classes will be evaluated as follows;
S: Achieved all goals and obtained total points of exam and reports, 90 or high (out of 100 points)
A: Achieved all goals and obtained total points of exam and reports, 80 or high (out of 100 points)
B: Achieved at least 65% of goals and obtained total points of exam and reports, 70 or high (out of 100 points)
C: Achieved at least 55% of goals and obtained total points of exam and reports, 60 or high (out of 100 points)
Examination
レポートで実施
By Report
Details of examination
None during exam period
Other information
N/A
Reference URL
N/A
Office hours
After each class
Relations to attainment objectives of learning and education
Key words

industrial technology, development technology, application technology

	nese Communication Theory[Japanese Communication Theory]	
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_	ommunication Theory[Japanese Co	_			
Subject name[English]	Japanese Communication Theory		-	- · ·	<b>D</b> · ·
Schedule number	M40030110	Subject area	General	Required or	Required
			courses	elective	
Time of starting a	Fall term	Day of the	Mon.4~4	Credit(s)	2
course		week,period		- · · ·	
Faculty	Graduate Program for Master's D	Degree		Subject	2~
				grade	
Department Offered			ivil Engineering,	Beggining	M2
	Electrical and Electronic Info	-		grade	
	Science and Engineering, Applied	I Chemistry and L	fe Science		
Charge teacher	石川 智嘉子 ISHIKAWA Chikako	D			
name[Roman alphabet					
mark]					
Numbering	GEN_LIB51412				
Objectives of class					
初級日本語の文法と表現	を習得し、日本人とコミュニケーシ	ョンができるように	なる。また日本語	でプレゼンテージ	ションができるよ
うになる。					
	e is to learn new Japanese gramm	nar/expression and	d how to use them	to communicate	e with Japanes
	having successfully taken this cou	-			-
Contents of class			0··		
初級レベルの日本語文法	と表現を学習します				
講義の内容は以下の通り					
時我の内台は以上の通り					
第1回 イントロダクション					
第2回 第13課 単語、プ	て法				
第3回 第13課 会話					
第4回 第14課 単語、プ	て法				
第5回 第14課 会話					
第6回 第15課 単語、3	z 法				
第7回 第15課 会話					
第8回 プレゼンテーション	ノトディカッパンコン				
第9回 第16課 単語、3					
第10回 第16課 会話	- <b>-</b>				
第11回 第17課 単語、	义法				
第12回 第17課 会話					
第13回 第18課 文法、					
第14回 第19課 文法、					
第15回 第20課 文法、					
第16回 定期試験(プレ-	ゼンテーションとディカッション)				
本学の新型コロナウィルス	ス感染拡大防止のための活動基準	の変更に伴い、採	受業内容および成績	青の評価法に変	更が生じる場合
があります。					
	「Google Meet による同時双方向」	で行う予定です			
	る場合は, GoogleClassroom また		ハトリ通知1 まま		
した Level: Elementary	の物白は、GoogleClassroolli よに	は我们前前秋~へ)	ムより通知しより。		
•	leving lessons in textbeak				
Students will learn the TOI	lowing lessons in textbook.				
Week 1. Introduction					
Week 2. Lesson 13 Vocab	•				
Week 3. Lesson 13 Conve	rsation				
Week 4. Lesson 14 Vocab	ulary & Grammar				
Week 5. Lesson 14 Conve	rsation				
Week 6. Lesson 15 Vocab	ulary & Grammar				
Week 7. Lesson 15 Conve	rsation				
Week 8. Presentation & D	iscussion				
Week 9. Lesson 16 Vocab					
Week10. Lesson 16 Conve					
Week11 Lesson 17 Voorh	ulary & Grammar				
Week11. Lesson 17 Vocat Week12. Lesson 17 Conve					

Week13. Lesson 18 Grammar & Conversation Week14. Lesson 19 Grammar & Conversation Week15. Lesson 20 Grammar & Conversation Week16. Exam(Presentation & Discussion)

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change. Classes are to be held in the style of regular face to face or on Google Meet; remote simultaneous interactive, so you can talk interactively with the lecturer over the Internet at a set time.

If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

#### Self Preparation and Review 予習:新出単語を見ておくこと(60分) 復習:毎回学習した内容を復習をしてください。毎回課題があるので、期限内に提出してください。(60分) Require to check new words beforehand and review after the lesson for around 60 minutes each. Should work on homework for each lesson. **Related subjects** 特になし N/A Textbook1 Book title 初級日本語げんきⅡ〔第3版〕/ Genki Ⅱ(Third ISBN 978-4-7890-Edition) 1732-9 坂野永理·池田 2020 Author Publisher The Japan Publish year 庸子·大野裕· Times 品川恭子·渡嘉 敷恭子 Notes for textbook 特になし N/A Notes for reference 特になし N/A Goals to be achieved 1) 初級レベルの日本語の文法および表現がわかる 2) 初級レベルの日本語を使ってコミュニケーションができる To understand Japanese grammar and expressions of elementary level to communicate with **Evaluation of achievement** 評価方法:プレゼンテーション2回 50%、課題 30%、授業貢献度 20% 左記の割合で評価する。 評価基準:原則的にすべての講義に出席したものにつき、下記のように成績を評価する。 S: 90 点以上 A: 80~89 点 B: 70~79 点 C: 60~69 点 Grading Policy: 2 Presentations 50%. Homework 30%. Contribution to the classes 20%. Students who attend all classes will be evaluated as follows: S: The total score is 90 or more A: The total score is 80-89 B: The total score is 70-79 C: The total score is 60-69 Examination その他 Other **Details of examination** 定期試験を実施:対面またはオンラインでプレゼンテーションを実施 Examination: Presentation (face to face or online) Other information 特になし N/A

**Reference URL** 特になし N/A Office hours 講義実施日の講義後 After the lecture Relations to attainment objectives of learning and education (D1)論文, 口頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーショ ンする能力を身につけている。 (D1) 論文, ロ頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーショ ンする能力を身につけている。 (D1) 論文, ロ頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーショ ンする能力を身につけている。 >>(D1) 論文, 口頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケー ションする能力を身につけている。 (D1) 論文, 口頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーショ ンする能力を身につけている。 (D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media (D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media (D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media (D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

Key words

日本語、初級、文法、コミュニケーション

Japanese, elementary, grammar, communication

# (M40110020)Ethics for Researchers[Ethics for Researchers]

(M40110020/Ethics for I		-				
Subject	Ethics for Re	searchers[Ethics for R	esearchers			
name[English]					<b>_</b>	
Schedule number	M40110020		Subject area	General	Required or	Required
				courses	elective	
Time of starting a	Fall1 term		Day of the	Wed.1~1	Credit(s)	1
course			week,period			
Faculty	Graduate Pro	ogram for Master's Deg	ree		Subject	1~
					grade	
Department Offered	Mechanical E	ingineering, Architectur	e and Civil Engin	eering, Electrical	Beggining	M1
	and Electron	nic Information Engin	eering, Compute	er Science and	grade	
	Engineering, <i>J</i>	Applied Chemistry and	Life Science		_	
Charge teacher		副委員長,田中 三郎 k		intyou, TANAKA S	Saburo	
name[Roman alphabet				-		
mark]						
Numbering	COM MAS51	015				
	0.011_11/1001	010				
Objectives of class						
Assist graduate student						
lead students to think					-	
research in accordance	with goals of s	cientific education and	research and cha	racteristics of ind	ividual research	specialties.
Contents of class						
1st week (October 6, 20	21):					
Introduction, 1st module	in e-learning					
2nd – 6th week (Octobe	r 13 - Novemb	er 17):				
2nd – 7th modules in e-	learning					
Submit the e-learning C	0	e Educational Affairs D	ivision			
7th week: (November 24						
Discussion with supervis		-,				
8th week:	•					
Report (December 1, 20	21)					
Treport (December 1, 20	21)					
e-learning						
1st module: Research M	isconduct					
2nd module: Ethical Issu	es in the Mana	gement of Data in				
Engineering Research						
3rd module: Responsible	Authorship					
4th module: Ethical Issue	es in the Peer	Review and				
Publication of Engineering	ng Research					
5th module: Collaborativ	-	Engineering				
Fields						
6th module: Whistleblow	ing and the Oh	ligation to				
Protect the Public						
	ublic Research	Funde				
7th module: Managing P	ubile riesearch					
Self Preparation and Re	view					
Students will need to re	fer to their tex	tbook to prepare for ar	id review each les	sson.		
Related subjects						
Philosophy of Science a	nd Technology	, Ethics for Engineers				
Notes for textbook						
Deference <sup>1</sup>	- الثلم والم مع	For the same data	pmont of a -!		ICDN	070_4_601
Reference1	Book title	For the sound develo		. the attitude of	ISBN	978-4-621-
		a conscientious scier		1		08938-5
	Author	edited by Japan	Publisher	Maruzen	Publish year	2015
		Society for the				
		Promotion of				
		Science Editing				
		Committee "For				
		the Sound				
		the Sound				

es for reference	
s://www.jsps.go.jp/j-kousei/data/rinri.pdf	
ls to be achieved	
prevent misconduct and promote fair research activities, this course provides knowledge and techniques regarding re	esearc
cs in accordance with characteristics of each graduate student' research specialties.	
luation of achievement	
valuation method] Report(100%)	
valuation basis]	
btained total points of exam and reports, 90 or higher (out of 100 points).	
btained total points of exam and reports, 80 or higher (out of 100 points).	
btained total points of exam and reports, 70 or higher (out of 100 points).	
Obtained total points of exam and reports, 60 or higher (out of 100 points).	
mination	
ートで実施	
Report	
ails of examination	
A	
er information	
ructor contact information:	
uro Tanaka(Chief): G605/tanakas@tut.jp	
erence URL	
х.	
ce hours	
time through email	
tions to attainment objectives of learning and education	
words	

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

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

Subject name[English]	Seminar on Mec	nanical Engineering I			
Schedule number	M41610010	Subject area	Advanced	Required or	Required
			Mechanical	elective	
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	4
<b>F</b> a and <b>h</b> a a	Que de la D	week,period		0.4/	1
Faculty		am for Master's Degre	e	Subject grade	1~
Department Offered	Mechanical Engi	neering		Beggining	M1
Charge teacher name[Roman	01 玄劫 称 禾 吕	1kei kyomu Iin-S		grade	
alphabet mark]	31 宋秋彻女員				
Numbering	MEC MAS51015	i			
Objectives of class	<u> </u>	•			
The seminar aims to provide a bro	ad understanding	of the mechanical e	ngineering availah	e for the master the	esis research of
student.					
The seminar aims to provide a bro	ad understandin	of the mechanical e	ngineering availab	le for the master the	esis research of
student.					
Contents of class					
The class provides both of fundar	mental knowledge	e of his/her master t	hesis research wo	ork and the most ad	vanced results i
the related field by reading resea	-				
announced by individual supervisor					
The class provides both of fundar		e of his/her master t	hesis research wo	ork and the most ad	vanced results i
the related field by reading resea	-				
announced by individual supervisor				-	
Self Preparation and Review					
Different in each laboratory					
Different in each laboratory					
Related subjects					
Different in each laboratory					
Different in each laboratory					
Notes for textbook					
Different in each laboratory					
Different in each laboratory					
Notes for reference					
N/A					
N/A					
Goals to be achieved					
To acquire fundamental knowledge	e of individual res	earch fields.			
To acquire the ability to find probl	ems, the ability t	o solve the problems,	and the presenta	tion skill.	
To acquire fundamental knowledge					
To acquire the ability to find probl	ems, the ability t	o solve the problems,	and the presenta	tion skill.	
Evaluation of achievement					
Holding meetings to report tasks f	or each laborato	ry and comprehensive	ly evaluating the i	results including con	tents,
materials and attitudes.					tents,
materials and attitudes. Grade levels are C(60% - less thar	n 70%), B(70– less	s than 80%), A(80% - I	ess than 90 %) and	d S(90% or over).	
Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f	n 70%), B(70– less	s than 80%), A(80% - I	ess than 90 %) and	d S(90% or over).	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes.	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b>	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b>	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b>	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	
materials and attitudes. Grade levels are C(60% - less thar Holding meetings to report tasks f materials and attitudes. Grade levels are C(60% - less thar <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A	n 70%), B(70- less or each laboratoi	s than 80%), A(80% – I ry and comprehensive	ess than 90 %) and Iy evaluating the r	d S(90% or over). results including con	

Different in each laboratory Different in each laboratory

Office hours

Different in each laboratory

Different in each laboratory

Relations to attainment objectives of learning and education

#### Key words

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

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

Subject name[English]	Seminar on Mech	hanical Engineering	II[Seminar on Mec	hanical 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 Progra	m for Master's De	gree	Subject grade	2~
Department Offered	Mechanical Engir	neering		Beggining	M2
				grade	
Charge teacher name[Roman alphabet mark]	S1系教務委員1	1kei kyomu Iin−S			
Numbering	MEC_MAS61015				
Objectives of class	-				
The seminar aims to provide a b student. The seminar aims to provide a b student. <b>Contents of class</b>	-				
		<b>C L : . .</b>			
The class provides both of fund the related field by reading res announced by individual supervis The class provides both of fund	earch papers and ors.	monographs. The	contents of the cl	ass depend on the s	supervisor. To b
the related field by reading res		monographs. The	contents of the cl	ass depend on the s	supervisor. To b
announced by individual supervis	sors.				
Self Preparation and Review					
Given by supervisors.					
Given by supervisors.					
Related subjects					
N/A					
N/A					
Notes for textbook					
Given by supervisors.					
Given by supervisors.					
Notes for reference					
N/A N/A					
Goals to be achieved					
To acquire fundamental knowled	ge of individual rese	earch fields			
To acquire the ability to find pro	-		is, and the present:	ation skill.	
To acquire fundamental knowled			,		
To acquire the ability to find pro	-		is, and the presenta	ation skill.	
			, pressince		
Evaluation of achievement					
Evaluated comprehensively by c	ontent reports con	siderations etc. o	presentation in ea	ch laboratory	
Grade levels are C(60% - less th					
Evaluated comprehensively by c					
Grade levels are C(60% - less th			•		
Examination			, -	· ·	
試験期間中には何も行わない					
試験期間中には何も行わない None during exam period					
None during exam period					
None during exam period Details of examination					
None during exam period Details of examination N/A					
None during exam period <b>Details of examination</b> N/A N/A	supervisor.				
None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b>	supervisor.				
None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b>	·				

#### Reference URL

N/A N/A

Office hours

Contact your supervisor.

Contact your supervisor.

Relations to attainment objectives of learning and education

#### Key words

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

(M41610030)Thesis Research on Mechanical Engineering[Thesis Research on Mechanical I	Engineering	
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Subject name[English]	Thesis Researc	h on Mechanical	Engir	eering[Thesis Re	search on Mechanica	I Engineering]
Schedule number	M41610030	Subject area		Advanced Mechanical Engineering	Required or elective	Required
Time of starting a course	2Years	Day of week,period	the	Intensive	Credit(s)	6
Faculty	Graduate Progr	am for Master's [	Degre	e	Subject grade	1~1
Department Offered	Mechanical Eng	gineering			Beggining grade	M1, M2
Charge teacher name[Roma alphabet mark]	<b>n</b> S1系教務委員	,1系各教員 1kei	kyor	nu Iin−S, 1kei kak	kukyouin	
Numbering	MEC_MAS6101	5				

#### Objectives of class

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

#### **Contents of class**

Follow instruction of supervisors.

Follow instruction of supervisors.

# Self Preparation and Review

Follow instruction of supervisors. Follow instruction of supervisors.

#### **Related** subjects

The work is related to every classes which has been studied in graduate and undergraduate schools.

The work is related to every classes which has been studied in graduate and undergraduate schools.

#### Notes for textbook

N/A

#### N/A

Notes for reference

#### N/A

N/A

#### Goals to be achieved

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

#### Evaluation of achievement

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90%) and S(90% or over).

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

 $Grade \ \text{levels are } C(60\% - \text{less than 70\%}), \ B(70 - \text{less than 80\%}), \ A(80\% - \text{less than 90\%}) \ \text{and} \ S(90\% \ \text{or over}).$ 

#### Examination

試験期間中には何も行わない

# None during exam period

Details of examination

None during exam period None during exam period Other information For any questions, contact your supervisor. For any questions, contact your supervisor. **Reference URL** N/A N/A Office hours Contact your supervisor. Contact your supervisor. Relations to attainment objectives of learning and education 機械工学専攻 (C)高度な知識を統合的に活用できる実践力・創造力 機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能 力を身につけている。 (C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。 (C2)機械工学およびその関連分野の広範囲の知識の連携により、研究開発に対する方法論を体得して、研究開発の計画を立 案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。 (D) グローバルに活躍できるコミュニケーションカ グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で、自らの考えや成果を効果的に表現するコミュニ ケーション力を身につけている。 (D1)論文, ロ頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーショ ンする能力を身につけている。 (D2)チーム内の個々の要員の価値観を互いに尊重するとともに、協調して、チームとしての目標達成に寄与できる高い能力を身 につけている。 (E)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計画し学習する能力を身につけている。 Graduate Program of Mechanical Engineering for Master's Degree (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner (C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about mechanical engineering and related fields; to make plans for research and development and put them intopractice; and to create new technologies to solve problems (D) Communication skills for global success Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members (D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media (D2) Have high skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members (E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment Have the skills to voluntarily make plans and learn throughout one's life in response to changesin society, environment and technology Key words Mechanical engineering. Mechanical system design. Materials and manufacturing. System control and robotics. Environment and energy Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

(M41610030)Thesis Research on Mechanical Engineering[Thesis Research on Mechanical I	Engineering	
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Subject name[English]	Thesis Researc	ch on Mechanical Engin	eering[Thesis Re	search on Mechanica	I Engineering]
Schedule number	M41610030	Subject area	Advanced Mechanical Engineering	Required or elective	Required
Time of starting a course	2Years	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Progr	ram for Master's Degre	e	Subject grade	1~1
Department Offered	Mechanical Eng	gineering		Beggining grade	M1, M2
Charge teacher name[Roma alphabet mark]	n S1系教務委員	i, 1系各教員 1kei kyon	nu Iin−S, 1kei kał	kukyouin	
Numbering	MEC MAS6101	5			

#### Objectives of class

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

#### **Contents of class**

Follow instruction of supervisors.

Follow instruction of supervisors.

# Self Preparation and Review

Follow instruction of supervisors. Follow instruction of supervisors.

#### **Related** subjects

The work is related to every classes which has been studied in graduate and undergraduate schools.

The work is related to every classes which has been studied in graduate and undergraduate schools.

#### Notes for textbook

N/A

#### N/A

Notes for reference

#### N/A

N/A

#### Goals to be achieved

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

#### Evaluation of achievement

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90%) and S(90% or over).

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

 $Grade \ \text{levels are } C(60\% - \text{less than 70\%}), \ B(70 - \text{less than 80\%}), \ A(80\% - \text{less than 90\%}) \ \text{and} \ S(90\% \ \text{or over}).$ 

#### Examination

試験期間中には何も行わない

# None during exam period

Details of examination

ļ	None during exam period
	None during exam period
	Other information
	For any questions, contact your supervisor.
	For any questions, contact your supervisor.
ļ	Reference URL
ļ	N/A
ļ	N/A
ļ	Office hours
ļ	Contact your supervisor.
ļ	Contact your supervisor.
ļ	Relations to attainment objectives of learning and education
ļ	
I	Key words
	-
	Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy
	Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and

energy

(M4161003T)Thesis Research on Mechanical Engineering Thesis Research on Mec	chanical E	ingineering]
---	------------	--------------

Subject name[English]	Thesis Researc	h on Mechanic	al Engi	neering[Thesis Re	esearch on Mechanica	al Engineering]
Schedule number	M4161003T	Subject a	ea	Advanced Mechanical Engineering	Required or elective	Required
Time of starting a course	Year	Day of week,peric	the d	Intensive	Credit(s)	6
Faculty	Graduate Progr	am for Master	's Degre	ee	Subject grade	2~2
Department Offered	Mechanical Eng	gineering			Beggining grade	M2
Charge teacher name[Roman alphabet mark]	S1系教務委員	,1系各教員1	kei kyo	mu Iin−S, 1kei kał	kukyouin	
Numbering	MEC_MAS6101	5				

#### Objectives of class

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

A research work of an unresolved engineering problem must be carried out in addition to class to become a leading engineer having creative and applied abilities that is education philosophy of department of mechanical engineering. Through carrying out the supervised research, active studying and researching are developed. By actively studying and researching, the research is developed furthermore. Finally, abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's in the process of the research work.

#### **Contents of class**

Follow instruction of supervisors.

Follow instruction of supervisors.

# Self Preparation and Review

Follow instruction of supervisors. Follow instruction of supervisors.

#### **Related subjects**

The work is related to every classes which has been studied in graduate and undergraduate schools.

The work is related to every classes which has been studied in graduate and undergraduate schools.

#### Notes for textbook

N/A

#### N/A

Notes for reference

N/A

#### N/A

#### Goals to be achieved

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

Abilities of problem-consciousness, problem-solving, problem-questing, planning, creativity, judgement, responsibility, toughness, cooperativeness, presentation, and ethics are polished up at a higher level than undergraduate's ones in the process of the research work.

#### Evaluation of achievement

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90 %) and S(90% or over).

Research work, tangible results, presentation and oral examination in presentation of master theses, etc. are evaluated comprehensively out of a hundred.

 $Grade \ \text{levels are } C(60\% - \text{less than 70\%}), \ B(70 - \text{less than 80\%}), \ A(80\% - \text{less than 90\%}) \ \text{and} \ S(90\% \ \text{or over}).$ 

#### Examination

試験期間中には何も行わない

None during exam period **Details of examination** 

ļ	None during exam period
	None during exam period
	Other information
	For any questions, contact your supervisor.
	For any questions, contact your supervisor.
ļ	Reference URL
ļ	N/A
ļ	N/A
ļ	Office hours
ļ	Contact your supervisor.
ļ	Contact your supervisor.
ļ	Relations to attainment objectives of learning and education
ļ	
I	Key words
	-
	Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy
	Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and

energy

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

Subject name[English]	Seminar on Mech	anical Engineering[3	eminar on Mechan	ical Engineering	r
Schedule number	M41610040	Subject area	Advanced	Required or	Required
			Mechanical	elective	
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6
		week,period			
Faculty	Graduate Program	n for Master's Degr	ee	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					
The seminar aims to provide a b	road understanding	of the mechanical e	ngineering available	e for the master the	sis research of a
student.					
The seminar aims to provide a b	road understanding	of the mechanical e	ngineering available	for the master the	sis research of
student.					
Contents of class					
The class provides both of fund	amental knowledge	of his /her master t	hesis research wo	rk and the most ad	vanced results in
the related field by reading res					
announced by individual supervis		nonographs. The co	filterits of the clas	s depend on the s	supervisor. To be
The class provides both of fund		of his/her master t	hesis research wo	rk and the most ad	vanced results in
the related field by reading res	-				
announced by individual supervis		nonographs. The co	filterits of the clas	s depend on the s	supervisor. To b
Self Preparation and Review					
•					
Given by supervisors.					
Given by supervisors.					
Related subjects					
N/A					
N/A					
Notes for textbook					
Given by supervisors.					
Given by supervisors.					
Notes for reference					
N/A					
N/A					
Goals to be achieved					
To acquire fundamental knowled	ge of individual rese	arch fields.			
To acquire the ability to find pro	blems, the ability to	solve the problems	and the presentat	ion skill.	
To acquire fundamental knowled	ge of individual rese	arch fields.			
To acquire the ability to find pro					
To abquire the ability to find pro	blems, the ability to	solve the problems	and the presentat	ion skill.	
To adquire the ability to find pro	blems, the ability to	solve the problems	and the presentat	on skill.	
Evaluation of achievement	blems, the ability to	solve the problems	and the presentat	on skill.	
Evaluation of achievement					
	ontent, reports, con	siderations, etc. of p	resentation in eacl	n laboratory.	
<b>Evaluation of achievement</b> Evaluated comprehensively by cr Grade levels are C(60% - less th	ontent, reports, con an 70%), B(70% - les	siderations, etc. of p s than 80%), A(80%	presentation in eacl - less than 90%) and	n laboratory. d S(90% or over).	
<b>Evaluation of achievement</b> Evaluated comprehensively by cr Grade levels are C(60% - less th Evaluated comprehensively by cr	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
<b>Evaluation of achievement</b> Evaluated comprehensively by cr Grade levels are C(60% - less th	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
<b>Evaluation of achievement</b> Evaluated comprehensively by cr Grade levels are C(60% - less th Evaluated comprehensively by cr Grade levels are C(60% - less th <b>Examination</b>	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by co Grade levels are C(60% - less th Evaluated comprehensively by co Grade levels are C(60% - less th Examination 試験期間中には何も行わない	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by co Grade levels are C(60% - less th Evaluated comprehensively by co Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by co Grade levels are C(60% - less th Evaluated comprehensively by co Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by cd Grade levels are C(60% - less th Evaluated comprehensively by cd Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by co Grade levels are C(60% - less th Evaluated comprehensively by co Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A N/A	ontent, reports, con an 70%), B(70% – les ontent, reports, con	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by cd Grade levels are C(60% - less th Evaluated comprehensively by cd Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A N/A N/A Other information	ontent, reports, con an 70%), B(70% – les ontent, reports, con an 70%), B(70% – les	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by co Grade levels are C(60% - less th Evaluated comprehensively by co Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A N/A	ontent, reports, con an 70%), B(70% – les ontent, reports, con an 70%), B(70% – les	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by cd Grade levels are C(60% - less th Evaluated comprehensively by cd Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A N/A Other information	ontent, reports, con an 70%), B(70% – les ontent, reports, con an 70%), B(70% – les	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	
Evaluation of achievement Evaluated comprehensively by cd Grade levels are C(60% - less th Evaluated comprehensively by cd Grade levels are C(60% - less th Examination 試験期間中には何も行わない None during exam period Details of examination N/A N/A Other information	ontent, reports, con an 70%), B(70% – les ontent, reports, con an 70%), B(70% – les supervisor.	siderations, etc. of p s than 80%), A(80% siderations, etc. of p	presentation in eacl - less than 90%) an presentation in eacl	n laboratory. d S(90% or over). n laboratory.	

#### Reference URL

N/A N/A

Office hours

Contact your supervisor.

Contact your supervisor.

Relations to attainment objectives of learning and education

#### Key words

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

# (M41610050)Internship[Internship]

(M41610050)Internship[Internshi Subject name[English]	Internship[Inter	nship]			
Schedule number	M41610050	Subject area	Advanced	Required or	Required
		- Ligebourou	Mechanical	elective	
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	0
		week,period			
Faculty	Graduate Progr	am for Master's Deg	ree	Subject grade	2~2
Department Offered	Mechanical Eng			Beggining	M2
-	_			grade	
Charge teacher name[Roman	S1系教務委員	1kei kyomu Iin-S			L
alphabet mark]					
Numbering	MEC_MAS51015	5			
Objectives of class					
Students are expected to addre	ss problems in a	specialized field in a	a company or rese	arch institute. The	bjectives of this
subject are to experience practi	-	-			-
ability, and creativity.					5 51 5
Students are expected to addre	ss problems in a	specialized field in a	a company or rese	arch institute. The	biectives of this
subject are to experience practi	-	-			-
ability, and creativity.					5;, p
Contents of class					
In order to cultivate the practica	l problem-solving	ability academic and	d.company/institut	ional supervisors will	provide practical
problems in a specialized field the					
In order to cultivate the practica	-		company/institut	ional supervisors will	provide practical
problems in a specialized field the		•		ional supervisors will	provide practical
Self Preparation and Review	ough close comm				
•	a a muafauabla inte	unabin tania with av	andarus hafaus at	autium it	
Students are expected to discuss	-			-	
Students are expected to discuss	s a preferable inte	ernship topic with su	pervisors before st	arting it.	
N/A					
N/A					
Notes for textbook					
Follow instructions provided by c					
Follow instructions provided by c	ompany/institutio	nal supervisors.			
Notes for reference					
N/A					
N/A					
Goals to be achieved					
While engaging practical activitie	s in a company o	r research institutio	n for several mont	hs, students are exp	ected to improve
the practical problem-solving abi	ity, planning abilit	y, and creativity as v	vell as an internatio	onal way of thinking.	
While engaging practical activitie	s in a company o	r research institutio	n for several mont	hs, students are exp	ected to improve
the practical problem-solving abi	ity, planning abilit	y, and creativity as v	vell as an internatio	onal way of thinking.	
Evaluation of achievement					
Comprehensive evaluation base	ed on students'	reports and evaluation	ation sheets by	academic and com	pany/institutional
supervisors.					
A: 80 or higher (out of 100 points	), B: 65 or higher	(out of 100 points) C	: 55 or higher (out	of 100 points)	
Comprehensive evaluation base	ed on students'	reports and evaluation	ation sheets by	academic and com	pany/institutional
supervisors.					
A: 80 or higher (out of 100 points	), B: 65 or higher	(out of 100 points) C	: 55 or higher (out	of 100 points)	
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
N/A					
Other information					
N/A					
N/A					
Reference URL					

N/A	
N/A Office hours	
N/A	
N/A	
Relations to attainment	t objectives of learning and education
Relations to attainment	t objectives of learning and education
Relations to attainment	t objectives of learning and education
Relations to attainment	t objectives of learning and education
Relations to attainment	t objectives of learning and education
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	t objectives of learning and education

#### (M41630040)Micromachining Engineering[Micromachining Engineering] Micromachining Engineering[Micromachining Engineering] Subject name[English] Schedule number M41630040 Required or Elective Subject area Advanced elective Mechanical Engineering Fall2 term Day of the Credit(s) Time of starting a Tue 1~1 1 course week,period Faculty Graduate Program for Master's Degree Subject 1~ grade Department Offered Mechanical Engineering Beggining M1 grade 柴田 隆行 SHIBATA Takayuki Charge teacher name[Roman alphabet mark] MEC MAS53025 Numbering **Objectives of class** "Micro Electro Mechanical Systems", the so-called MEMS, can be defined as miniaturized systems that consist of micromachined sensors, actuators, passive components, and integrated circuits (IC) for applications in micromechanics, nanoscience, photonics, bio-electrochemical systems, and so on. The MEMS field has been one of the most exciting technologies during the past decade. The objective of this course is to introduce fundamentals of micromachining technologies (microfabrication technologies), and their application in the development of MEMS devices. **Contents of class** 1st week: Introduction of Micro Electro Mechanical System (MEMS) 2nd week: Photolithography 3rd week: Wet etching and Dry etching 4th week: Physical vapor deposition (PVD) 5th week: Chemical vapor deposition (CVD) 6th week: Plating and Electroforming 7th week: Bonding processes 8th week: Presentation and discussion Note: If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change. If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM. Self Preparation and Review Students are required to prepare and review each lesson. Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/ **Related subjects** A fundamental knowledge of physics and chemistry is required. Notes for textbook No textbook is required for this class. Handouts will be prepared. Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/ ISBN 9780849308260 Reference 1 Book title Fundamentals of Microfabrication (2nd ed.): The Science of Miniaturization Author Marc J. Madou Publisher **CRC** Press Publish 2002 year 9780470851067 Reference2 Book title Introduction to Microfabrication ISBN Author Sami Franssila John Wiley & Publish 2004 Publisher Sons year Reference3 Book title The MEMS Handbook (2nd ed.) ISBN 9780849321061 Mohamed Gad-Publisher **CRC** Press Publish 2006 Author el-Hak year Notes for reference N/A Goals to be achieved

To gain an understanding of the fundamentals of micromachining technologies for MEMS.

- (1) To understand the principle and characteristics of photolithography.
- (2) To understand the principle and characteristics of etching processes.
- (3) To understand the principle and characteristics of deposition processes.
- (4) To understand the principle and characteristics of bonding processes.

(5) To apply knowledge of micromachining technologies to the design and manufacturing of microdevices.

#### Evaluation of achievement

Students will be evaluated by presentation (70%) and classroom performance (30%). An oral presentation on micromachining technologies for the fabrication of MEMS devices will be imposed during the course of class.

[Evaluation basis] Students who attend all classes will be evaluated as follows:

- S: Achieved all goals and obtained total points of the report, 90 or higher (out of 100 points).
- A: Achieved all goals and obtained total points of the report, 80 or higher (out of 100 points).

B: Achieved 80 % of goals and obtained total points of the report, 70 or higher (out of 100 points).

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

#### Examination

授業を実施

**Regular Class** 

Details of examination

Note: Regular Class (Presentation and discussion)

Other information

N/A

**Reference URL** 

N/A

Office hours

Anytime during regular working hours. Contact me by email before coming if possible. **Relations to attainment objectives of learning and education** 

#### 機械工学専攻

(C)高度な知識を統合的に活用できる実践力・創造力

機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能 カを身につけている。

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。 (C2)機械工学およびその関連分野の広範囲の知識の連携により、研究開発に対する方法論を体得して、研究開発の計画を立 案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。

Graduate Program of Mechanical Engineering for Master's Degree

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about mechanical engineering and related fields; to make plans for research and development and put them intopractice; and to create new technologies to solve problems

#### Key words

MEMS, Micromachining, Microfabrication, Photolithography, Wet etching, Dry etching, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), Plating, Bonding processes

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

Subject name[English]		nical Systems Desig	n I[Advanced Me	chanical Systems De	sign I]	
Schedule number	M41630210	Subject area	Advanced	Required or	Elective	
			Mechanical	elective		
			Engineering			
Time of starting a course	Fall term	Day of the week,period	Mon.4∼4	Credit(s)	2	
Faculty	Graduate Program	m for Master's Degre	e	Subject grade	1~	
Department Offered	Mechanical Engin	neering		Beggining	M1	
				grade		
Charge teacher name[Roman alphabet mark]	S1系教務委員1	kei kyomu Iin−S				
Numbering	MEC_MAS53025					
Objectives of class						
This lecture aims to provide a b work of a student. This lecture aims to provide a b work of a student. Contents of class	-					
Follow instruction of supervisors						
Follow instruction of supervisors						
Self Preparation and Review						
Follow instruction of supervisors						
Follow instruction of supervisors Related subjects						
•						
Follow instruction of supervisors						
Follow instruction of supervisors Notes for textbook						
NOTES FOR TEXTDOOK						
N/A N/A						
N/A Notes for reference						
Notes for reference						
N/A N/A						
Goals to be achieved						
To acquire fundamental knowled	ra of individual room	arah fialda				
	-		and the presents	tion akill		
To acquire the ability to find pro	bients, the ability to	solve the problems	and the presenta	uon skiii.		
To acquire fundamental knowled	-					
To acquire the ability to find pro	blems, the ability to	solve the problems	and the presenta	tion skill.		
Evaluation of achievement						
Coursework, presentation and/o	r report.					
Grade levels are C(60% - less th		than 80%), A(80% - I	ess than 90 %) an	d S(90% or over).		
Coursework, presentation and/o						
Grade levels are C(60% - less th	-	than 80%), A(80% - I	ess than 90 %) an	d S(90% or over).		
Examination						
試験期間中には何も行わない						
None during exam period						
Details of examination						
N/A						
N/A						
Other information						
For any questions, contact your	supervisor.					
For any questions, contact your	supervisor.					
Reference URL						
N/A						
N/A						
N/A Office hours						

Contact your supervisor. Relations to attainment objectives of learning and education

Key words

Mechanical Systems Design Mechanical Systems Design

Subject name[English]	s and Manufacturing Process I[Advanced Materials and Manufacturing Process I] Advanced Materials and Manufacturing Process I[Advanced Materials and Manufacturing Process I]							
Schedule number	M41630230	Subject area	Advanced Mechanical Engineering	Required or elective	Elective			
Time of starting a course	Fall term	Day of the week,period	Tue.4~4	Credit(s)	2			
Faculty	Graduate Progr	am for Master's Degre	e	Subject grade	1~			
Department Offered	Mechanical Eng	ineering	Beggining	M1				
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin−S							
Numbering	MEC_MAS5402	MEC MAS54025						
Objectives of class								
This lecture aims to provide a b work of a student. This lecture aims to provide a b work of a student. <b>Contents of class</b>	road understandin	-						
Follow instruction of supervisors Follow instruction of supervisors								
Self Preparation and Review	•							
Follow instruction of supervisors								
Follow instruction of supervisors	•							
Related subjects								
Follow instruction of supervisors								
Follow instruction of supervisors Notes for textbook	•							
N/A								
N/A								
Notes for reference								
N/A								
N/A								
Goals to be achieved								
To acquire fundamental knowled	ge of individual res	search fields.						
To acquire the ability to find pro	plems, the ability t	to solve the problems	and the presenta	ition skill.				
To acquire fundamental knowled To acquire the ability to find pro	-		and the presenta	ation skill.				
Evaluation of achievement								
Coursework, presentation and/or	r report.							
Grade levels are C(60% - less th		s than 80%), A(80% – I	ess than 90 %) ar	nd S(90% or over).				
Coursework, presentation and/or	•							
Grade levels are C(60% - less the	an 70%), B(70- les	s than 80%), A(80% – I	ess than 90 %) ar	nd S(90% or over).				
<b>Examination</b> 試験期間中には何も行わない								
None during exam period								
Details of examination								
N/A								
N/A								
Other information								
For any questions, contact your	•							
For any questions, contact your <b>Reference URL</b>	supervisor.							
N/A								

Contact your supervisor. Contact your supervisor.

Relations to attainment objectives of learning and education

**Key words** Materials, Manufacturing Process Materials, Manufacturing Process

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

Subject name[English]				ystem, Control and F	
Schedule number	M41630250	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
Time of starting	Fall taum	Dave of the	Engineering	Oue dit/->	0
Time of starting a course	Fall term	Day of the	Wed.4~4	Credit(s)	2
Faculty	Graduate Program	<b>week,period</b> n for Master's Degre	0	Subject grade	1~
Department Offered	Mechanical Engine	-	.0	Beggining	M1
	0	U		grade	
Charge teacher name[Roman	S1系教務委員 11	kei kyomu Iin−S			
alphabet mark]					
Numbering	MEC_MAS55025				
Objectives of class					
This lecture aims to provide a bro	oad understanding	of the mechanical s	ystems design av	ailable for the maste	r thesis research
work of a student.		. <b></b>			
This lecture aims to provide a brown work of a student.	oad understanding	of the mechanical s	ystems design av	allable for the maste	r thesis research
Contents of class					
Follow instruction of supervisors.					
Follow instruction of supervisors.					
Self Preparation and Review					
Follow instruction of supervisors.					
Follow instruction of supervisors.					
Related subjects					
Follow instruction of supervisors.					
Follow instruction of supervisors.					
Notes for textbook					
N/A					
N/A					
Notes for reference					
N/A					
N/A Goals to be achieved					
To acquire fundamental knowledg	a of individual room	rah fialda			
To acquire the ability to find prob			and the precental	ion skill	
To acquire the ability to find prob	iems, the ability to	solve the problems		lon skii.	
To acquire fundamental knowledg	a of individual room	rah fialda			
To acquire the ability to find prob			and the presentat	ion skill	
To acquire the ability to find prob	terns, the ability to		and the presenta		
Evaluation of achievement					
Evaluation of achievement	report				
Coursework, presentation and/or			ess than 90 %) and	d S(90% or over)	
Coursework, presentation and/or Grade levels are C(60% - less tha	n 70%), B(70- less t		ess than 90 %) and	d S(90% or over).	
Coursework, presentation and/or	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b>	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A	n 70%), B(70- less t report.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b>	n 70%), B(70- less f report. n 70%), B(70- less f	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b> For any questions, contact your s	n 70%), B(70- less f report. n 70%), B(70- less f supervisor.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b> For any questions, contact your s For any questions, contact your s	n 70%), B(70- less f report. n 70%), B(70- less f supervisor.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b> For any questions, contact your s For any questions, contact your s <b>Reference URL</b>	n 70%), B(70- less f report. n 70%), B(70- less f supervisor.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b> For any questions, contact your s For any questions, contact your s <b>Reference URL</b> N/A	n 70%), B(70- less f report. n 70%), B(70- less f supervisor.	than 80%), A(80% – I			
Coursework, presentation and/or Grade levels are C(60% - less tha Coursework, presentation and/or Grade levels are C(60% - less tha <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A N/A <b>Other information</b> For any questions, contact your s For any questions, contact your s <b>Reference URL</b>	n 70%), B(70- less f report. n 70%), B(70- less f supervisor.	than 80%), A(80% – I			

Contact your supervisor. Relations to attainment objectives of learning and education

Key words

System, Control, Robotics System, Control, Robotics

Advanced Energy and Environmental Engineering I[Advanced Energy and Environ Engineering I]					
M41630270	Subject area	Advanced Mechanical	Required or elective	Elective	
Fall term	Day of the week,period	Fri.1~1	Credit(s)	2	
Graduate Program	n for Master's Deg	ree	Subject grade	1~	
Mechanical Engineering			Beggining grade	M1	
S1系教務委員 1kei kyomu Iin−S					
MEC_MAS56025					
-					
·					
-		and the presenta	tion skill.		
		and the presenta	tion skill.		
an 70%), B(70− less t report.					
		un			
Supervisor.					
	Engineering [] M41630270 Fall term Graduate Program Mechanical Engine S1系教務委員 11 MEC_MAS56025 road understanding of road understand	Engineering [] M41630270 Subject area Fall term Day of the week,period Graduate Program for Master's Degr Mechanical Engineering S1系教務委員 1kei kyomu Iin-S MEC_MAS56025 road understanding of the mechanical road understanding of the mechanical road understanding of the mechanical solems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems ge of individual research fields. plems, the ability to solve the problems for report. an 70%), B(70- less than 80%), A(80% - for report. an 70%), B(70- less than 80%), A(80% -	Engineering []       M41630270       Subject area       Advanced Mechanical Engineering         Fall term       Day of the week.period       Fri.1~1         Graduate Program for Master's Degree       Mechanical Engineering         S1系教務委員 1kei kyomu lin-S       MEC_MAS56025         oad understanding of the mechanical systems design av oad understanding of the mechanical systems design av oad understanding of the mechanical systems design av eod understanding of the mechanical systems design av oad understanding of the mechanical systems design av supervisor.	Engineering I]       Multiple target       Advanced Mechanical Engineering       Required or elective         Fall term       Day of the week,period       Fri.1~1       Credit(s)         Graduate Program for Master's Degree       Subject grade         Mechanical Engineering       Beggining grade         S1系教務委員 1kei kyomu lin-S         MEC_MASS6025         oad understanding of the mechanical systems design available for the master oad understanding of the mechanical systems design available for the master oad understanding of the mechanical systems design available for the master         ge of individual research fields. Jelems, the ability to solve the problems and the presentation skill.         report. an 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over). report. an 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over).         supervisor.	

Contact your supervisor. Contact your supervisor.

Relations to attainment objectives of learning and education

Key words

Energy, Environment Energy, Environment

## (M41630330)Advances in Mechanical Design[Advances in Mechanical Design]

Subject name[English]	Advances in Mec	hanical Design[Adva	nces in Mechanic	al Design]	1
Schedule number	M41630330	Subject area	Advanced Mechanical	Required or elective	Elective
Time of starting a course	Fall2+Spring1	Day of the week,period	Engineering Tue.1~1	Credit(s)	2
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2
Department Offered	Mechanical Engin	-		Beggining	M2
				grade	
Charge teacher name[Roman alphabet mark]	河村 庄造,柴田	隆行 KAWAMURA	Shozo, SHIBATA	Takayuki	
Numbering	MEC_MAS53025				
Fall 2 : Micromachining Engineer "Micro Electro Mechanical Symicromachined sensors, actual nanoscience, photonics, bio-el technologies during the past de (microfabrication technologies),	ystems", the so-ca tors, passive compo lectrochemical syste cade. The objective	onents, and integra ems, and so on. T of this course is to	ted circuits (IC) he MEMS field introduce fundam	) for applications in has been one of th nentals of micromachi	micromechanic ne most excitir
Spring 1 : Vibration Engineering This lecture will provide the k degree of freedom system.		analysis method and	l component mo	de synthesis method	l to treat a hug
Contents of class					
Fall 2 : Micromachining Engineer	ring (Shibata)				
1st week: Introduction of Micro	-	Svstem (MEMS)			
2nd week: Photolithography					
3rd week: Wet etching and Dry	etching				
4th week: Physical vapor depos	ition (PVD)				
5th week: Chemical vapor depos					
6th week: Plating and Electrofor					
7th week: Bonding processes	0				
8th week: Presentation and disc	cussion				
Spring 1 : Vibration Engineering					
Modal analysis for multi degree 1: Introduction of modal analysis					
2: A system with proportional vi					
3: A system with proportional vi					
4: Compensate of higher vibratio					
Component mode synthesis me	thod				
5: Formulation of sub-systems					
6: Modal synthesis using constr	aint modes (1)				
7: Modal synthesis using constru	aint modes (2)				
8: Modal synthesis using non-co	onstraint modes				
Note:	. <del>.</del>		1 A		
If there will be any changes r		=			or Preventing th
Spread of Corona virus, the cou			-	-	
If there is any changes about a	ciass schedule, it wil	i be informed via Go	ogle Classroom o	Dr KYUMU JUHO SYS	SIEM.
Self Preparation and Review					
Fall 2 : Micromachining Engineer	-				
Students are required to prepar					, ,
Useful information on MEMS te	cnnologies can be ob	tained from the follo	wing website; ht	tp://www.memsnet.or	g/mems/
Spring 1 : Vibration Engineering	(Kawamura)				
Self-preparation and review are					

Self-preparation and review are necessary.

Related subjects
Fall 2 : Micromachining Engineering (Shibata)
A fundamental knowledge of physics and chemistry is required.
Spring 1 : Vibration Engineering (Kawamura)
Dynamics, Vibration engineering, Mechanical vibration
Notes for textbook
Fall 2 : Micromachining Engineering (Shibata)
No textbook is required for this class. Handouts will be prepared.
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
Spring 1 : Vibration Engineering (Kawamura)
Handouts will be prepared
Notes for reference
Fall 2 : Micromachining Engineering (Shibata)
1) Fundamentals of Microfabrication (2nd ed.): The Science of Miniaturization
Marc J. Madou, CRC Press, 2002, ISBN: 9780849308260
2) Introduction to Microfabrication
Sami Franssila, John Wiley & Sons, 2004, ISBN: 9780470851067
3) The MEMS Handbook (2nd ed.)
Mohamed Gad-el-Hak, CRC Press, 2006, ISBN: 9780849321061
Goals to be achieved
Fall 2 : Micromachining Engineering (Shibata)
To gain an understanding of the fundamentals of micromachining technologies for MEMS.
(1) To understand the principle and characteristics of photolithography.
(2) To understand the principle and characteristics of etching processes.
(3) To understand the principle and characteristics of deposition processes.
(4) To understand the principle and characteristics of bonding processes.
(5) To apply knowledge of micromachining technologies to the design and manufacturing of microdevices.
Spring 1 : Vibration Engineering (Kawamura)
(1) Understand the modal analysis for multi degree of freedom system
(2) Understand the component mode synthesis method  Evaluation of achievement
Fall 2 : Micromachining Engineering (Shibata)
Students will be evaluated by presentation (70%) and classroom performance (30%). An oral presentation on micromachining
technologies for the fabrication of MEMS devices will be imposed during the course of class.
[Evaluation basis] Students who attend all classes will be evaluated as follows: S: Achieved all goals and obtained total points of the generit, 90 as higher (out of 100 points)
S: Achieved all goals and obtained total points of the report, 90 or higher (out of 100 points). A: Achieved all goals and obtained total points of the report, 80 or higher (out of 100 points).
B: Achieved 80 % of goals and obtained total points of the report, 70 or higher (out of 100 points). C: Achieved 60 % of goals and obtained total points of the report, 60 or higher (out of 100 points).
C: Achieved 60 % of goals and obtained total points of the report, 60 or higher (out of 100 points).
Spring 1 : Vibration Engineering (Kawamura)
Method: report (full score 100).
Level: achievement in the case upper 60 points.
Level S: upper 90 points, Level A: upper 80 points, Level B: upper 70 points, Level C: upper 60 points
Examination
その他
Other
Details of examination
Fall 2 : Micromachining Engineering (Shibata)
Regular Class (Presentation and discussion)
Spring 1 : Vibration Engineering (Kawamura)
Report
Other information
Fall 2 : Micromachining Engineering (Shibata)
Contact person: Prof. Takayuki Shibata, E-Mail: shibata@me.tut.ac.jp
Spring 1 : Vibration Engineering (Kawamura)

Contact person: Prof. Shozo Kawamura E-Mail:kawamura@me.tut.ac.jp

## Reference URL

N/A Office hours

Fall 2 : Micromachining Engineering (Shibata)

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

Spring 1 : Vibration Engineering (Kawamura)

Ask by E-mail.

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

機械工学専攻

(C)高度な知識を統合的に活用できる実践力・創造力

機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能 カを身につけている。

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。 (C2)機械工学およびその関連分野の広範囲の知識の連携により、研究開発に対する方法論を体得して、研究開発の計画を立 案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。

Graduate Program of Mechanical Engineering for Master's Degree

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about mechanical engineering and related fields; to make plans for research and development and put them intopractice; and to create new technologies to solve problems

#### Key words

Modal analysis, Component mode synthesis method, MEMS, Micromachining, Microfabrication, Photolithography, Wet etching, Dry etching, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), Plating, Bonding processes

Modal analysis, Component mode synthesis method, MEMS, Micromachining, Microfabrication, Photolithography, Wet etching, Dry etching, Physical vapor deposition (PVD), Chemical vapor deposition (CVD), Plating, Bonding processes

Subject name[English]	Advances in	Thermal and Fluid M	lechanics[Advance	es in Thermal and	Fluid Mechanics]	
Schedule number	M41630350		Subject area	Advanced	Required or	Elective
				Mechanical	elective	
				Engineering		
Time of starting a	Fall term		Day of the	Mon.1~1	Credit(s)	2
course	Que durate Dura		week,period		Cutie et	0.5.0
Faculty	Graduate Pro	gram for Master's D	Jegree		Subject grade	2~2
Department Offered	Mechanical E	ngineering			Beggining	M2
0h h h		中村 祐二 YANADA			grade	
Charge teacher	柳田 穷記, •	中か」 和二 IANADA		RA TUJI		
name[Roman alphabet						
mark]						
Numbering	MEC_MAS560	J25				
Objectives of class						
Fluid power systems uti	lize pressurized	l fluid (oil, air, water)	) to transfer powe	r and output mecl	nanical power thro	ugh fluid powe
actuators. Thermal pow	er systems utili	ize thermal energy o	obtained by chemi	cal reaction to tr	ansfer mechanical	power throug
the energy conversion d	evices.					
In this class, students a	acquire knowled	lge of structures ar	nd theories of flui	d and thermal po	wer components a	nd systems a
well as dynamics of flu	id in pipelines.	In addition, student	ts acquire informa	ation on recent to	opics of fluid and	thermal powe
engineering.						
Contents of class						
If there will be any ch	anges regardin	g Toyohashi Univer	rsity of Technolog	gy Activity Restri	ctions Level for	Preventing th
Spread of Corona virus,	the course con	tent and evaluation	of achievement a	re subject to char	ige.	
If there is any changes a	about a class so	chedule, I will inform	you on Google Cl	assroom or KYON	IU JOHO SYSTEM	1.
4th week(on demand): D 5th week(on demand): D 6th week(on demand): D 7th week(on demand): R 8th week(on demand or 	ynamics of fluic ynamics of fluic ecent topics of face to face): F  Introduction to ): Governing eq ): chemical read ): Ignition ): One-dimension ): Scale modelin ): Scale modelin	d in pipeline (solution d in pipeline (unstead fluid power system Recent topics of fluid o combustion phenor uations and non-din otion onal flame theory ng in reactive system ng in reactive system	n of wave equation dy laminar flow, fre s d power systems ( mena nensionalization ms (1) ms (2)	n, water/oil hamm equency response 45 min) and exam	er) ) ination (45 min)	
16th week(face-to-face	): Recent topics	s of thermo-reactive	e systems (45 min	) and examination	(45 min)	
Self Preparation and Re	view					
Students are requested	to review each	class and prepare t	the next class by r	eading the teachi	ng material.	
Students are expected	to complete	their homework (if	f any) and exerc	ise/training on a	voluntarily basis	to gain dee
understanding what was	taught in the c	oursework.				
To enhance a learning	effect, students	s are encouraged to	o refer to their re	eference materials	. To prepare for a	and review th
lecture for around 90 mi	nutes each.					
Related subjects						
Fluid mechanics, Mather	natics (complex	variables, Laplace	transform), Therm	odynamics, Chem	ical reaction, Heat	transfer
Notes for textbook						
No Textbook is required						
D.f	D I !!!		0.1			
Reference1	Book title	Fluid Transients in	n Systems		ISBN	

 Book title
 Fluid Transients in Systems
 ISBN

 Author
 Wylie, Streeter,
 Publisher
 McGraw-Hill
 Publish year

		Lisheng				
Reference2	Book title	Fundamental Aspec	cts of Combust	tion	ISBN	0-19-
				-		507626-5
	Author	A. Linan and F.A. Williams	Publisher	Oxford Press	Publish year	1993
Notes for reference						
N/A Goals to be achieved	4					
	-	eristics of fluid power	components			
		ciency of fluid power		nd systems		
To be able to derive			oompononeo u			
To understand water	•					
To understand recer	t topics of fluid p	ower systems				
To understand what	t is the effectiv	e mathematical app	roach (with pi	roper simplification)	to solve combi	ustion problem
theoretically.			•			
Evaluation of achiev	ement					
Each student's achie	vement is evaulat	ed by the sum of exa	mination (50%) a	and reports (50%).		
Students will be eval	uated as follows:					
S: Obtained total poi	nts of exam and r	eports, 90 or higher (d	out of 100 point	ts).		
A: Obtained total poi	nts of exam and r	eports, 80 or higher (d	out of 100 point	ts).		
B: Obtained total poi	nts of exam and r	eports, 70 or higher (d	out of 100 point	ts).		
C: Obtained total poi	nts of exam and r	eports, 60 or higher (d	out of 100 point	ts).		
Examination						
定期試験を実施(対)						
Examination(Face to	•					
Details of examination						
Each student has to	take a calculator	with him/her.				
Other information						
Prof.Yanada						
Room: D309, Tel.(Ext	t.): 6668, e−mail: y	anada@me.tut.ac.jp				
Prof.Nakamura	) 6647					
Room: D311, Tel.(Ext Reference URL	): 0047, e-mail: y	uji@me.tut.ac.jp				
N/A						
Office hours						
	is fine but the ti	me for discussion ca	n he determin	ed through e-mails y	when instructor	is absent from
his/her office.			in be determin			
	ent objectives of	learning and education	n			
カを身につけている。 (C1)機械工学および (C) Practical and cre Have advanced know such knowledge forp (C1) Have the skills to utilize such knowl	関連分野に関する。 その関連分野の理 ative skills to utili vledge about mecl roblem solving in a to voluntarily acq edge in an integra	る高度な知識を修得し 理論・応用知識を自発 ze advanced knowled hanical engineering ar an integrated manner uire theories and appl	的に獲得し, そ ge in an integra nd related fields lied knowledge	れらを統合的に活用 ited manner s and have the practi about mechanical en	できる能力を身に ical and creative gineering and rel:	つけている。 skills to utilize ated fields; and
knowledge about m intopractice; and to a	echanical enginee create new techno	ring and related field ologies to solve proble ze advanced knowled	ds; to make p ems	lans for research a		
Harrison and the second						
	vledge about mecl	hanical engineering an an integrated manner	nd related fields	s and have the practi	ical and creative	skills to utiliz
such knowledge forp (C1) Have the skills to utilize such knowl	vledge about mecl roblem solving in a to voluntarily acq	an integrated manner uire theories and appl				
such knowledge forp (C1) Have the skills to utilize such knowl <b>Key words</b>	vledge about mecl roblem solving in a to voluntarily acq edge in an integra	an integrated manner uire theories and appl	lied knowledge	about mechanical en	gineering and rel	

## (M41630380)Robotics[Robotics]

name[English]	Robotics[Ro	DOUCS]				
Schedule number	M41630380		Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Fall term		Day of the week,period	Fri.2~2	Credit(s)	2
Faculty	Graduate Pr	ogram for Master's Deg			Subject grade	2~
Department Offered	Mechanical I	Engineering		Beggining grade	M2	
Charge teacher name[Roman alphabet mark]		JCHIYAMA Naoki				
Numbering	MEC_MAS55	025				
Objectives of class						
-	s of robotics: ki	nematics, dynamics an	d motion control	of multiple rigid-bo	dies connected	in series wi
revolute or prismatic j				e. marcipio rigio DO	2.20 00.1100.000	001100 WI
Contents of class	01110.					
	k: Poprocontati	on and transformation	of positions and	rientations in 2-D -	nace I	
	-	on and transformation	-		-	
	-	ation and transformatio	in or positions and	a orientations in 3-L	space II	
(face to face) 3rd we		π				
	eek: Kinematics					
(face to face) 5th we						
		and static forces II		• • • •		
		summary (including th	e intermediate ex	amination)		
(face to face) 8th we	-					
	eek: Dynamics I					
	eek: Dynamics I	Ш				
(face to face) 11th we						
	eek: Control II					
	eek: Control III					
(face to face) 14th we	ek: Summary (ir	icluding the end-term e	examination)			
If there will be any cha	anges regarding	Toyohashi University o	f Technology Act	ivity Restrictions Le	evel for	
-		s, the course content a		-		
					-	
If there is any change	s about a class	schedule, I will inform y	rou on Google Cla	ssroom or KYOMU.	IOHO SYSTEM	
is any onaligo					Lene ererem.	
	Deview					
Salf Duan aretica and						
Self Preparation and I						
Read the handouts be						
Read the handouts be Related subjects	fore the lecture					
Read the handouts be <b>Related subjects</b> Fundamentals of linear	fore the lecture	nics and control theor	у.			
Read the handouts be <b>Related subjects</b> Fundamentals of linear <b>Notes for textbook</b>	fore the lecture r algebra, mecha		у.			
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa	fore the lecture r algebra, mecha		у.			
Read the handouts be <b>Related subjects</b> Fundamentals of linear <b>Notes for textbook</b>	fore the lecture r algebra, mecha			and Control, 3rd	ISBN	
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa	fore the lecture r algebra, mecha ared.	nics and control theory		and Control, 3rd	ISBN Publish year	2005
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa Reference1	fore the lecture r algebra, mecha ared. <b>Book title</b>	inics and control theory Introduction to Rob Edition	otics: Mechanics Publisher	,		2005
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa Reference1	fore the lecture r algebra, mecha ared. Book title Author Book title	Introduction to Rob Edition J. J. Craig Robot Modeling and	otics: Mechanics Publisher Control	Prentice Hall	Publish year ISBN	
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa	fore the lecture r algebra, mecha ared. Book title Author	nics and control theor Introduction to Rob Edition J. J. Craig	otics: Mechanics Publisher	,	Publish year	2005
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa Reference1	fore the lecture r algebra, mecha ared. Book title Author Book title	Introduction to Rob Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M.	otics: Mechanics Publisher Control	Prentice Hall John Wiley &	Publish year ISBN	
Read the handouts be Related subjects Fundamentals of linear Notes for textbook Handouts will be prepa Reference1	fore the lecture r algebra, mecha ared. Book title Author Book title	Introduction to Rob Edition J. J. Craig Robot Modeling and M. W. Spong, S.	otics: Mechanics Publisher Control	Prentice Hall John Wiley &	Publish year ISBN	
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Read the handouts be Related subjects Fundamentals of lineau Notes for textbook Handouts will be prepa Reference1 Reference2 Notes for reference N/A Goals to be achieved Be able to derive kineau	fore the lecture r algebra, mecha ared. Book title Author Book title Author author Book title	Introduction to Rob Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M.	otics: Mechanics Publisher Control Publisher	Prentice Hall John Wiley &	Publish year ISBN	

The grade will be determined by reports (35%), the intermediate examination score (30%) and the end-of-term examination score (35%).

The credit of this course is given if the score of the above examination is 60% or over.

Grade levels are C (60% - less than 70%), B (70 - less than 80%), A (80 - less than 90%) and S (90% or over).

**Examination** 定期試験を実施(対面)

Examination(Face to Face)

Details of examination

N/A

Other information

Office: Room D-406, E-mail uchiyama@tut.jp **Reference URL** 

N/A

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

### Key words

Manipulator, Dynamics, Control

(M41630400)Robot	Kinematics[Robot	Kinematics]
------------------	------------------	-------------

Subject name[English]	Robot Kinem	natics[Robot Kinematic	s				
Schedule number	M41630400		Subject area	Advanced Mechanical Engineering	Required or elective	Elective	
Time of starting a course	a Fall1 term		Day of the week.period	Fri.2~2	Credit(s)	1	
Faculty	Graduate Pr	ogram for Master's De		I	Subject grade	1~	
Department Offered	Mechanical I	Mechanical Engineering Beggining M1 grade					
Charge teache name[Roman alphabe mark]		JCHIYAMA Naoki				I	
Numbering	MEC_MAS55	025					
Objectives of class							
Provides fundamental	s of robot kinem	atics on multiple rigid-	bodies connected	in series with revo	lute or prismatic	joints.	
	veek: Velocities a ek: Summary (in	and static forces I and static forces II cluding the end-term e	examination)				
Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea	d of Corona virus s about a class s <b>Review</b> ifore the lecture.		and evaluation of a	achievement are su	bject to change.		
Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook	d of Corona virus s about a class s <b>Review</b> ofore the lecture r algebra and me	s, the course content a schedule, I will inform y	and evaluation of a	achievement are su	bject to change.		
Preventing the Spread	d of Corona virus s about a class s <b>Review</b> ofore the lecture r algebra and me	s, the course content a schedule, I will inform y	and evaluation of a	achievement are su ssroom or KYOMU	bject to change.		
Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook Handouts will be prep	d of Corona virus s about a class s <b>Review</b> ofore the lecture r algebra and me ared.	s, the course content a schedule, I will inform y 	and evaluation of a	achievement are su ssroom or KYOMU	bject to change. JOHO SYSTEM.	2005	
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Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook Handouts will be prep Reference1 Reference2 Notes for reference N/A Goals to be achieved Be able to derive kine	d of Corona virus s about a class s Review offore the lecture r algebra and me ared. Book title Author Book title Author Author	s, the course content a schedule, I will inform y echanics. Introduction to Rot Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M. Vidyasagar	and evaluation of a you on Google Cla potics: Mechanics Publisher Control	achievement are su ssroom or KYOMU and Control, 3rd Prentice Hall John Wiley &	JOHO SYSTEM.	2005	
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Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook Handouts will be prep Reference1 Reference2 Notes for reference N/A Goals to be achieved Be able to derive kine Evaluation of achieve The grade will be dete	d of Corona virus s about a class s fore the lecture r algebra and me ared. Book title Author Book title Author matics of roboti ment ermined by repor	s, the course content a schedule, I will inform y echanics. Introduction to Rot Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M. Vidyasagar c manipulators. ts (30%) and the end-o	and evaluation of a you on Google Cla potics: Mechanics Publisher Control Publisher	achievement are su ssroom or KYOMU and Control, 3rd Prentice Hall John Wiley & Sons	JOHO SYSTEM.	2005	
Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook Handouts will be prep Reference1 Reference2 Notes for reference N/A Goals to be achieved Be able to derive kine Evaluation of achieve The grade will be dete	d of Corona virus s about a class s fore the lecture r algebra and me ared. Book title Author Book title Author matics of roboti ment ermined by repor	s, the course content a schedule, I will inform y echanics. Introduction to Rot Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M. Vidyasagar c manipulators. ts (30%) and the end-or e score of the above e	and evaluation of a you on Google Cla potics: Mechanics Publisher Control Publisher	achievement are su ssroom or KYOMU and Control, 3rd Prentice Hall John Wiley & Sons on score (70 %). or over.	bject to change. JOHO SYSTEM. ISBN Publish year ISBN Publish year	2005	
Preventing the Spread If there is any change Self Preparation and Read the handouts be Related subjects Fundamentals of linea Notes for textbook Handouts will be prep Reference1 Reference2 Notes for reference N/A Goals to be achieved Be able to derive kine Evaluation of achieve The grade will be dete	d of Corona virus s about a class s fore the lecture r algebra and me ared. Book title Author Book title Author matics of roboti ment ermined by repor	s, the course content a schedule, I will inform y echanics. Introduction to Rot Edition J. J. Craig Robot Modeling and M. W. Spong, S. Hutchinson, M. Vidyasagar c manipulators. ts (30%) and the end-o	and evaluation of a you on Google Cla potics: Mechanics Publisher Control Publisher	achievement are su ssroom or KYOMU and Control, 3rd Prentice Hall John Wiley & Sons on score (70 %). or over.	bject to change. JOHO SYSTEM. ISBN Publish year ISBN Publish year	2005	

#### Details of examination

#### N/A Other information

Office: Room D-406, E-mail uchiyama@tut.jp Reference URL

N/A

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

Key words

Manipulator, Kinematics

## (M41630450)Fluid Power Engineering[Fluid Power Engineering]

Subject	Fluid Power	Engineering[Fluid Power Eng	gineering]						
name[English]	M41000450		0.11		D				
Schedule number	M41630450		Subject area	Advanced Mechanical Engineering	Required or elective	Elective			
Time of starting a course	Fall1 term		Day of the week,period	Mon.1~1	Credit(s)	1			
Faculty	Graduate P	rogram for Master's Degree	Subject grade	1~					
Department	Mechanical	Mechanical Engineering M1							
Offered		grade							
Charge teacher	柳田 秀記	YANADA Hideki							
name[Roman									
alphabet mark]	MEC MAS5	2025							
Numbering Objectives of class		J02J							
actuators. In this class as dynamics of fluid in <b>Contents of class</b> If there will be any Spread of Corona viru If there is any change 1st week(on demand): 2nd week(on demand): 3rd week(on demand): 4th week(on demand): 5th week(on demand): 6th week(on demand): 7th week(on demand):	s, students an pipelines. In changes rega us, the course s about a class Introduction : Strutures an Power loss a Dynamics of Dynamics of Recent topic or face to fac	ized fluid (oil, air, water) to t cquire knowledge of structur addition, students acquire in rding Toyohashi University content and evaluation of ac ss schedule, I will inform you to fluid power systems id theories of fluid power cor nd efficiencies of fluid power cor nd efficiencies of fluid power cor fluid in pipeline (derivation of fluid in pipeline (solution of v fluid in pipeline (unsteady lan s of fluid power systems e): Recent topics of fluid power	es and theories o formation on rece of Technology A chievement are su on Google Classr nponents r systems f one-dimensional wave equation, wa minar flow, freque	f fluid power com nt topics of fluid p ctivity Restriction ibject to change. oom or KYOMU J wave equation) ter/oil hammer) ncy response)	ponents and sy power engineeri ns Level for Pr OHO SYSTEM.	stems as well ng.			
	ed to review e	each class and prepare the n	ext class by readi	ng the prnted tead	ching material.				
Related subjects			forme						
Fluid mechanics, Math	iematics (com	plex variables, Laplace trans	aorm)						
Printed teaching mate	erials are give	1							
Reference1	Book title	Fluid Transients			ISBN				
	Author	Wylie/Streeter/Lisheng	Publisher	McGraw-Hill	Publish				
	Autrior	wylie/ Streeter/ Lisheng	Publisher	wcGraw-rill	year				
Notes for reference	l	I		1	<b>, 50</b>	1			
N/A									
Goals to be achieved									
	ate output an	aracteristics of fluid power c d efficiency of fluid power cc ons of fluid in pipeline	•	stems					
4.To understand wate	•								
5.To understand rece		uid power systems							
Evaluation of achieve	ment								
Each student's achiev	rement is eval	uated by the sum of examina	ation (50%) and						

reports (50%).

Students will be evaluated as follows:

- S: Obtained total points of exam and reports, 90 or higher (out of 100 points).
- A: Obtained total points of exam and reports, 80 or higher (out of 100 points).
- B: Obtained total points of exam and reports, 70 or higher (out of 100 points).
- C: Obtained total points of exam and reports,  $60\ {\rm or}\ {\rm higher}\ ({\rm out}\ {\rm of}\ 100\ {\rm points}).$

#### Examination

定期試験を実施(対面) Examination(Face to Face)

#### Details of examination

Each student has to take a calculator with  $\operatorname{him}/\operatorname{her}$ 

#### Other information

Office:D-309, Tel:44-6668, e-mail:yanada@me.tut.ac.jp

Reference URL

N/A

Office hours

The date and time are arranged by e-mail.

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

(C)高度な知識を統合的に活用できる実践力・創造力

機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能力を身につけている。

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

Key words

フルードパワー,波動,水撃,非定常流,振動流

Fluid power, Wave propagation, Water hammer, Unsteady flow, Oscillatory flow

### (M41630463)Advances in Systems, Control and Robotics[Advances in Systems, Control and Robotics]

Subject name[English]	Advances in Sys	tems, Control and Ro	botics[Advances in	Systems, Control	and Robotics]
Schedule number	M41630463	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
			Engineering		
Time of starting a course	Fall2+Spring	Day of the week,period	Tue.2~2	Credit(s)	2
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~2
Department Offered	Mechanical Engir	-		Beggining	M2
				grade	
Charge teacher name[Roman alphabet mark]	高木 賢太郎, 髙	5山 弘太郎 TAKAGI	Kentaro, TAKAYAN	IA Kotaro	
Numbering	MEC MAS55025				
Objectives of class	-				
The purpose of this lecture is: (Fall semester, Prof. Takagi) to practical applications and (Spring semester, Prof. Takayam			-		to use them i
Contents of class					
The following contents will be pro-	ovided.				
(Fall semester, Prof. Takagi) (1) (on-demand) Modeling with si (2) (in-person/online) State equa (3) (on-demand) Stability and tim (4) (in-person/online) Controllab (5) (on-demand) State feedback (6) (in-person/online) Observabil (7) (in-person/online) Full-order (8) (in-person/online) Review 45	ation and transfer for the response ility and state feed and pole placement ity and state observer state observer and	back t ver I observer-based cor	itroller		
(Spring semester, Prof. Takayam (1) (On-demand) Advanced agric (2) Environmental control for agr (3) (On-demand) Environmental (4) (4) Measurement system for pho (5) (On-demand) Measurement s (6) Plant growth monitoring with (7) (On-demand) Plant growth m (8) Review 45min, examination/re (In-person/online unless specifie	ultural production i icultural production control for agricultu tosynthesis and tra ystem for photosyr imaging robot I onitoring with imagi eporting 45min	I Iral production II Inspiration of crop I Inthesis and transpirat	tion of crop II		
If there is any changes about a c	lass schedule, it wi	ill be informed via Go	ogle Classroom or ł	(YOMU JOHO SYS	TEM.
If there will be any changes re Spread of Corona virus, the cour		-			r Preventing th
Self Preparation and Review			a suth a a le		
To enhance a learning effect, stu		-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu		-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b>		-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A		-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b>	re for around 90 mi	-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b> Handouts will be prepared by the	re for around 90 mi	-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b>	re for around 90 mi	-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b> Handouts will be prepared by the	re for around 90 mi	-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b> Handouts will be prepared by the <b>Notes for reference</b>	re for around 90 mi	-	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu <b>Related subjects</b> N/A <b>Notes for textbook</b> Handouts will be prepared by the <b>Notes for reference</b> Reference books will be announce	re for around 90 mi e lecturers. ed in the lecture.	nutes each.	textbook.		
To enhance a learning effect, stu Prepare for and review the lectu Related subjects N/A Notes for textbook Handouts will be prepared by the Notes for reference Reference books will be announce Goals to be achieved	re for around 90 mi e lecturers. ed in the lecture.	nutes each.	textbook.		

(2) To understand controllability and observability
(3) To be able to design state feedback gain by pole placement
(4) To be able to design a state observer
(Spring semester, Prof. Takayama)
(1) To acquire basic knowledge of advanced agricultural engineering
(2) To acquire adequate knowledge of environmental control and robotics in agriculture
(3) To acquire adequate knowledge of image analysis for control in agriculture
Evaluation of achievement
Exam 90%, Report or Quiz 10%
Students who attend all classes will be evaluated as follows:
S:total score of examination and report is 90 pointrs or higher.
A:total score of examination and report is 80 pointrs or higher.
B:total score of examination and report is 70 pointrs or higher.
C:total score of examination and report is 60 pointrs or higher.
Examination
定期試験を実施(オンライン)
Examination(On line)
Details of examination
A report, or web exam, or both will be taken place if the paper exam is not available.
Other information
Ν/Α
Reference URL
Ν/Α
Office hours
Write comment on Google Classroom if you have questions. The questions will be answered around the lecture time. In case
you have personal or urgent questions, send email directly to the lecturer.
Relations to attainment objectives of learning and education
(C)高度な知識を統合的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能
力を身につけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize
such knowledge forproblem solving in an integrated manner
Key words
Modern control, State equation, State feedback, State observer, Environmental control, Plant diagnosis, Robotization
Automation
nation

## (M41630470)Microstructural Control of Metallic Materials[Microstructural Control of Metallic Materials]

Subject name[English]	Microstructural C	ontrol of Metallic	Materials[Microstru	ctural Control of Met	tallic Materials]			
Schedule number	M41630470	Subject area	Advanced	Required or	Elective			
			Mechanical	elective				
			Engineering					
Time of starting a course	Fall2 term	Day of th	e Thu.2~2	Credit(s)	1			
-		week,period						
Faculty	Graduate Program	Graduate Program for Master's Degree Subject grade 1~						
Department Offered	Mechanical Engine	Mechanical Engineering Beggining M1						
-	_	grade						
Charge teacher name[Roman	三浦 博己 MIUR	A Hiromi			L			
alphabet mark]								
Numbering	MEC_MAS54025							
Objectives of class								
N/A								
Learn about newest strengthenin	g mechanisms of me	tallic materials a	and microstructural o	control for strengther	ning			
Contents of class								
N/A								
1. Guidance and metallic material	e							
2. Grain-boundary energy and dis								
3. Grain-boundary energy and me								
4. Static recrystallization and mic								
5. Dynamic recrystallization and r								
Self Preparation and Review		101						
	atoviala in mondato							
Basic knowledge about metallic m <b>Related subjects</b>	laterials is manuato	ry						
•								
N/A								
N/A								
Notes for textbook								
N/A								
Text will be provided								
Notes for reference								
N/A								
N/S								
Goals to be achieved								
N/A								
To know newest topics on micros	structural control fo	r strengthening o	of metallic materials					
Evaluation of achievement								
N/A								
Reports after classes are require	d for evaluation inst	ead of examinat	on					
Examination								
レポートで実施								
By Report								
Details of examination								
N/A								
N/A								
Other information								
N/A								
N/A								
Reference URL								
N/A								
N/A								
Office hours								
N/A								
After classes								
Relations to attainment objective	es of learning and e	lucation						
N/A								
(C)高度な知識を統合的に活用で	できる実践力・創造ス	<b>b</b>						

機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能 カを身につけている。

(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。 (C2)機械工学およびその関連分野の広範囲の知識の連携により、研究開発に対する方法論を体得して、研究開発の計画を立 案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。

To know newest topics on microstructural control of metallic materials

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about mechanical engineering and related fields; to make plans for research and development and put them intopractice; and to create new technologies to solve problems

Key words

N/A

Microstructural control

## (M41630480)Combustion Theory[Combustion Theory]

Subject name[English]	<b>O</b> I ·· ·		<b>T</b> I 1			
		Theory[Combustion	1			-
Schedule number	M41630480		Subject area	Advanced	Required or	Elective
				Mechanical	elective	
				Engineering		
Time of starting a	Fall2 term		Day of the	Mon.3~3	Credit(s)	1
course			week,period			
Faculty	Graduate Pro	ogram for Master's [	Degree		Subject	1~
Department Offered	Mechanical E	ngineering			grade Beggining	M1
Department Onered					grade	
Charge teacher	中村 祐二 N	IAKAMURA Yuji				1
name[Roman alphabet mark]						
Numbering	MEC MAS56	025				
Objectives of class	_					
This coursework offers	the advanced a	upproach to understa	anding the combus	tion processes an	d its impact Stud	lents can lear
the theoretical approac						
useful to predict the per	Tormance of th	le compusitor.				
Contents of class						
1st week(face-to-face):	Introduction to	o combustion pheno	mena			
2nd week(face-to-face)	: Governing equ	uations and non-dim	ensionalization			
Brd week(face-to-face):	chemical react	tion				
4th week(face-to-face):	Ignition					
5th week(face-to-face):	One-dimension	nal flame theory				
6th week(face-to-face):	Scale modeling	g in reactive system	ıs (1)			
7th week(face-to-face):	-					
8h week(face-to-face):				and examination (4	5 min)	
(*) If there will be any Spread of Corona virus,	the course cor		-			Freventing th
(*) IT there is any chang	es about a clas	s schedule, I will infe	orm you on Google	e Classroom or KY	-	EM.
		s schedule, I will inf	orm you on Google	e Classroom or KY	-	ſEM.
(*) If there is any chang <b>Self Preparation and Re</b> Students are expected	view				OMU JOHO SYST	
<b>Self Preparation and Re</b> Students are expected	<b>view</b> to complete	their homework (it			OMU JOHO SYST	
Self Preparation and Re Students are expected understanding what was	<b>view</b> to complete taught in the c	their homework (il coursework.	f any) and exerc	ise/training on a	OMU JOHO SYST	to gain dee
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定期試験を実施(対面)	
Examination(Face to Face)	
Details of examination	
Each student has to take a calculator with him/her.	
Other information	
Prof.Nakamura	
Room: D311, Tel.(Ext.): 6647, e-mail: yuji@me.tut.ac.jp	
Reference URL	
N/A	
Office hours	
Basically, any time is fine, but the time for discussion can be determined through e-mails when instructor is his/her office.	absent fron
Relations to attainment objectives of learning and education	
(C)高度な知識を統合的に活用できる実践力・創造力	
機械工学およびその関連分野に関する高度な知識を修得し, それらを課題解決のために統合的に活用できる実践	的·創造的能
力を身につけている。	
(C1)機械工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身にこ	っけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner	
Have advanced knowledge about mechanical engineering and related fields and have the practical and creative s such knowledge forproblem solving in an integrated manner	kills to utiliz
(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and relat to utilize such knowledge in an integrated manner	ed fields; an
(C2) Have the skills to learn, by experience, methodologies for research and development through integrati	ing extensiv
knowledge about mechanical engineering and related fields; to make plans for research and development a	and put then
intopractice; and to create new technologies to solve problems	
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner	
Have advanced knowledge about mechanical engineering and related fields and have the practical and creative s	kills to utiliz
such knowledge forproblem solving in an integrated manner	
(C1) Have the skills to voluntarily acquire theories and applied knowledge about mechanical engineering and relat	ed fields: an
to utilize such knowledge in an integrated manner	

Combustion, Reacting flow

## (M41630490)Modern Control Engineering[Modern Control Engineering]

Subject name[English]	Modern Control	Engineering[Modern	Control Engineering		
Schedule number	M41630490	Subject area	Advanced	Required or	Elective
			Mechanical	elective	
			Engineering		
Time of starting a course	Fall2 term	Day of the	Tue.2~2	Credit(s)	1
	Creducto Dregres	week,period		Cubicat made	1~
Faculty	_	m for Master's Degr	ee	Subject grade	M1
Department Offered	Mechanical Engir	heering		Beggining grade	
Charge teacher name[Roman	高木 賢太郎 TA	AKAGI Kentaro		0	I
alphabet mark]					
Numbering	MEC_MAS55025				
Objectives of class					
The purpose of this lecture is practical applications.	to learn the fundan	nentals of the mode	rn control theory a	nd to exercise hov	v to use them i
Contents of class					
The following contents will be pr	ovided;				
(1) (on-demand) Modeling with s					
(2) (in-person/online) State equ		unction			
(3) (on-demand) Stability and tin					
(4) (in-person/online) Controllab		back			
(5) (on-demand) State feedback	-				
(6) (in-person/online) Observabi					
(7) (in-person/online) Full-order	•		ntroller		
(8) (in-person/online) Review 45					
If there is any changes about a c			ogle Classroom or k		TEM
If there will be any changes re		-			r Preventing th
Spread of Corona virus, the cou	rse content and eva	aluation of achieveme	ent are subject to cl	nange.	
Self Preparation and Review					
To enhance a learning effect, stu	udents are encoura	ged to refer to their	textbook.		
Prepare for and review the lectu	re for around 90 m	inutes each.			
Related subjects					
N/A					
Notes for textbook					
Handouts will be prepared by the	e lecturer.				
Notes for reference					
Reference books will be annound	ed in the lecture.				
Goals to be achieved					
Students are expected					
(1) To understand state space m	nodeling.				
(2) To understand controllability	0.				
(3) To design state feedback gai		t, and			
(4) To design a state observer					
as the goal of this lecture.					
Evaluation of achievement					
Exam 90%, Report or Quiz 10%					
Students who attend all classes	will be evaluated as	s follows:			
S:total score of examination a					
A:total score of examination a		-			
B:total score of examination a		-			
C:total score of examination a		-			
Examination					
定期試験を実施(オンライン)					
定期試験を実施(オンライン) Examination(On line)					
定期試験を実施(オンライン) Examination(On line) <b>Details of examination</b>	vill he taken place H	f the naner even is r	not available		
定期試験を実施(オンライン) Examination(On line) <b>Details of examination</b> A report, or web exam, or both v	vill be taken place it	f the paper exam is r	not available.		
定期試験を実施(オンライン) Examination(On line) <b>Details of examination</b>	vill be taken place it	f the paper exam is r	not available.		

### **Reference URL**

#### N/A Office hours

Write comment on Google Classroom if you have questions. The questions will be answered around the lecture time. In case you have personal or urgent questions, send email directly to the lecturer.

Relations to attainment objectives of learning and education

(C)高度な知識を統合的に活用できる実践力・創造力 機械工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能 力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about mechanical engineering and related fields and have the practical and creative skills to utilize such knowledge forproblem solving in an integrated manner

Key words

Modern control, State equation, State feedback, Controllability, Observability, Full-order observer

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

Electronic Information Engineeri	-				
Subject name[English]		on Electrical and E	-	ion Engineering[The	esis Research on
<u></u>		ectronic Information		<b>_</b>	<b>.</b>
Schedule number	M42610020	Subject area	Advanced	Required or	Required
			Electrical and	elective	
			Electronic		
			Information		
Time of stations and	21/2017	Davi of 11	Engineering	0 ma di#(-)	6
Time of starting a course	2Years	Day of the	Intensive	Credit(s)	6
Country.	Cueduete Due mes	week,period m for Master's Degre		Cubicat meda	11
Faculty Department Offered	0	0		Subject grade	1~1 M1
Department Offered		ectronic Information	Lingineering	Beggining grade	
Charge teacher name[Roman	S2系数務委員	2系各教員 2kei kyoi	mu lin-S. 2kei kakuk	-	
alphabet mark]				(youn)	
Numbering	ELC MAS51025				
Objectives of class					
The thesis research aims to pro	vide a practical av	nerience of received	work and to acc	uire his/her record	ah akill with daca
understanding of the electrical ar	-		work, and to acqu	me ms/ner researd	an anii witri deep
Contents of class					
The research subject depends o	n the supervisor of	nd the research are	un vou belong to F	very student will h	ave an individual
research subject. For more detail	-	-	up you belong to. L	wory student will f	
	s, please contact v	and your supervisor.			
Self Preparation and Review					
N/A					
Related subjects					
N/A					
Notes for textbook					
Reference and material will be av	ailable from the su	pervisor.			
Notes for reference					
N/A					
Goals to be achieved					
To get something new on individu					
To develop his/her research skill	including the plann	ning and the present	ation.		
Evaluation of achievement					
Presentation, Thesis, Coursework	k, and Outcomes ar	e evaluated generall	у.		
Grades: S: 90-100, A:80-89, B:70	-79, C:60-69				
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A					
Reference URL					
N/A					
Office hours					
N/A					
Relations to attainment objective	es of learning and e	oducation			
電気·電子情報工学専攻					
電気・電ナ情報工学専攻 (B)技術者・研究者としての正しし	い倫理組と社会性				
(B)投納者・研究者として社会的上して社会的		1 オ会におけてせ	術的理題を設定・	報決 証価する能す	った身につけてい
上級技術者・研究者として社会的 る。	っ ⊪ 理 的 員 仕 ど 有	10, TLAICのりるな	「「「「「「「「」」「「」」「「」」「「」」「「」」「」」「」」「」」「」」「	ヰ゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚゚	して オーレン しい
◎。 (C)高度な知識を統合的に活用 <sup>-</sup>	できる実践力・創造	+			
(C)高度な知識を統合的に活用 電気・電子情報工学およびその			それらを理顧留は	のために紘全的い	「任田できる宇建
电丸・电丁旧取工子のよいての	メモリポートしょう	司戌は叫敵を修守し	,(1しつど沐闼件)		- 四田 しこの天岐

的・創造的能力を身につけている。

(C1) 電気・電子情報工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C2) 電気・電子情報工学およびその関連分野の広範囲の知識の連携により、研究開発に対する方法論を体得して、研究開発の計画を立案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。

(D)グローバルに活躍できるコミュニケーションカ

グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で,自らの考えや成果を効果的に表現するコミュニケーション力を身につけている。

(D1) 論文, 口頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーションする能力を身につけている。

(D2) チーム内の個々の要員の価値観を互いに尊重するとともに、協調して、チームとしての目標達成に寄与できる高い能力を 身につけている。

(E)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計画し学習する能力を身につけている。

(B) Sound ethics and social awareness as advanced-level engineers and researchers

Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Graduate Program of Electrical and Electronic Information Engineering for Master's Degree

(B) Sound ethics and social awareness as advanced-level engineers and researchers

Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technicalissues in society

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills toutilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for researchand development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

Subject name[English]	Thesis Researc	h on Electrical and E	lectronic Informat	ion Engineering[Th	esis Research or
Carlon Hamole I Bioli		lectronic Information	-		
Schedule number	M42610020	Subject area	Advanced Electrical and Electronic Information	Required or elective	Required
Time of starting a course	2Years	Day of the	Engineering Intensive	Credit(s)	6
-		week,period			
Faculty	_	am for Master's Degre		Subject grade	1~1
Department Offered	Electrical and E	lectronic Information	Engineering	Beggining grade	M1
Charge teacher name[Roman	S2系教務委員,	, 2系各教員 2kei kyoi	mu Iin-S, 2kei kakul	-	
alphabet mark]					
Numbering	ELC_MAS51025				
Objectives of class					
The thesis research aims to pro-	vide a practical e	xperience of research	n work, and to acqu	uire his/her researd	ch skill with deer
understanding of the electrical ar	nd electronic infor	mation engineering.			
Contents of class					
The research subject depends o	n the supervisor	and the research gro	up you belong to. E	every student will h	nave an individua
research subject. For more detail	s, please contact	with your supervisor.			
Self Preparation and Review					
N/A					
Related subjects					
N/A					
Notes for textbook					
Reference and material will be av	ailable from the s	upervisor.			
Notes for reference					
N/A					
Goals to be achieved					
To get something new on individu	al research fields				
To develop his/her research skill	including the plar	ning and the present	ation.		
Evaluation of achievement					
Presentation, Thesis, Coursework	, and Outcomes a	are evaluated generall	у.		
Grades: S: 90–100, A:80–89, B:70		6) <b>u</b> i	-		
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A					
Reference URL					
N/A					
Office hours					
N/A					
Relations to attainment objective	s of learning and	education			
(B) Sound ethics and social awar					
Be conscious of specialized and	•	ilities as advanced-le	evel engineers and	researchers; have	the ability to se
solve and evaluate technical issu	•				
(C) Practical and creative skills to		-	-		
Have advanced knowledge about				as related fields; h	ave the practica
and creative skills to utilize such	knowledge for pro	oblem solving in an int	egrated manner		

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

Subject name[English]		h on Electrical and E	-	ion Engineering[The	esis Research o
		lectronic Information			Γ
Schedule number	M4261002T	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Required
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6
	Graduata Brage	week,period am for Master's Degre		Subject mede	2~2
Faculty Department Offered	_	lectronic Information		Subject grade Beggining	Z~2 M2
			Lingineering	grade	IVIZ
Charge teacher name[Roman alphabet mark]	S2系教務委員	,2系各教員 2kei kyoi	mu Iin−S, 2kei kakuł	•	
Numbering	ELC_MAS51025	i			
<b>Objectives of class</b> The thesis research aims to pro understanding of the electrical a <b>Contents of class</b> The research subject depends of research subject. For more detai	nd electronic infor	mation engineering. and the research gro			
Self Preparation and Review					
N/A					
Related subjects					
N/A					
Notes for textbook					
Reference and material will be av	vailable from the s	upervisor.			
Notes for reference					
N/A					
Goals to be achieved					
To get something new on individ To develop his/her research skil			ation		
Evaluation of achievement		ining and the presenta			
Presentation, Thesis, Coursewor	k, and Outcomes	are evaluated generall	у.		
Grades: S: 90-100, A:80-89, B:70	0-79, C:60-69				
試験期間中には何も行わない					
None during exam period Details of examination					
N/A					
Other information					
N/A					
Reference URL					
N/AA					
Office hours					
N/A					
Relations to attainment objectiv	es of learning and	education			
(B) Sound ethics and social awar	eness as advance	d-level engineers and	researchers		
Be conscious of specialized and	ethical responsib	oilities as advanced-le	vel engineers and i	researchers; have t	the ability to s
solve and evaluate technical issu	ies in society				
	a subtract and some and		wated meanings		
		-	-		
(C) Practical and creative skills t Have advanced knowledge about and creative skills to utilize such	t electrical and el	ectronic information e	engineering as well	as related fields; h	ave the practic

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information

engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

Engineering				· · · ·	<b>-</b>
Subject name[English]		ectrical and Electroni	c Information Eng	gineering[Seminar o	on Electrical an
Schedule number	Electronic Info M42610040	rmation Engineering] Subject area	Advanced Electrical and Electronic Information	Required or elective	Required
			Engineering		
Fime of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Progr	am for Master's Degre	ee	Subject grade	2~2
Department Offered	Electrical and E	electronic Information	Engineering	Beggining grade	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員	2kei kyomu Iin−S		8	
Numbering	ELC_MAS51015	5			
lectronic information engineerin Contents of class The class provides both of funda elated field by reading research ndividual supervisors.	mental knowledge	on the research work	< of master thesis a		
Self Preparation and Review					
N/A					
Related subjects					
N/A					
Notes for textbook					
Textbook or material will be made	e available from t	he supervisor. To be a	nnounced by individ	lual supervisors.	
Notes for reference N/A					
Goals to be achieved					
To acquire fundamental knowledg	ge on individual re	search fields.			
To acquire the ability of finding a	problem, the abil	ity of solving the prob	lem and the present	tation skill.	
Evaluation of achievement					
Coursework, presentation and/or	report.				
Grades: S: 90-100, A:80-89, B:70	-79, C:60-69				
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A Reference URL					
Office hours					
N/A					
Relations to attainment objective	es of learning and	education			
(B) Sound ethics and social awar	eness as advance	ed-level engineers and	researchers		
Be conscious of specialized and solve and evaluate technical issu	-	oilities as advanced-le	evel engineers and i	researchers; have t	the ability to se
(C) Practical and creative skills t		d knowledge in an inte	grated manner		
Have advanced knowledge about			•	an related fields: h	ava tha practice

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical

and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

Subject name[English]	Seminar on Ele	ctrical and Electronic	Information Engin	eering 1A[Seminar	on Electrical a
	Electronic Info	rmation Engineering 1	A]		
Schedule number	M42610050	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	4
Faculty	Graduate Progr	am for Master's Degre	ee	Subject grade	1~
Department Offered	Electrical and E	lectronic Information	Engineering	Beggining grade	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員	2kei kyomu Iin−S			
Numbering	ELC_MAS51015				
Objectives of class					
The seminar aims to provide a b electronic information engineering <b>Contents of class</b> The class provides both of funda related field by reading research idividual supremainders	g for the research mental knowledge	on the research work	ter thesis. < of master thesis a	nd the most advan	ced results in t
individual supervisors.					
Self Preparation and Review					
N/A Related autients					
Related subjects N/A					
N/A Notes for textbook					
Textbook or material will be made	a available from +4	e supervisor To boo	unnounced by individ	lual supervisors	
Notes for reference		le supervisor. To be a			
N/A					
Goals to be achieved					
To acquire fundamental knowledg	re on individual re	search fields			
To acquire the ability of finding a	-		lem and the presen	tation skill.	
Evaluation of achievement	, ,	, , ,	•		
Coursework, presentation and/or Grades: S: 90-100, A:80-89, B:70	-				
<b>Examination</b> 試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A Reference LIPI					
Reference URL N/A					
Office hours					
N/A					
Relations to attainment objective	es of learning and	education			
-	-				
(B) Sound ethics and social awar	eness as advance	d-level engineers and	l researchers		
Be conscious of specialized and		ilities as advanced-le	evel engineers and	researchers; have	the ability to s
solve and evaluate technical issu	,				
(C) Practical and creative skills t		-	-		
Have advanced knowledge about				as related fields; h	ave the praction
and creative skills to utilize such (C1) Have the skills to volunt		-	-		

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information

engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

Information Engineering 1B] Subject name[English]	Seminar on Elec	trical and Electronic	Information Engin	eering 18[Seminar	on Electrical and
		mation Engineering 1	-		
Schedule number	M42610060	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~
Department Offered	Electrical and El	ectronic Information	Engineering	Beggining grade	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員	2kei kyomu Iin−S		-	L
Numbering	ELC_MAS51015				
<b>Objectives of class</b> The seminar aims to provide a be electronic information engineering <b>Contents of class</b> The class provides both of funda	g for the research	work of his/her mast	ter thesis.		
related field by reading research individual supervisors. <b>Self Preparation and Review</b>					
N/A					
Related subjects					
N/A					
Notes for textbook					
Textbook or material will be made		e supervisor. To be a	nnounced by individ	iual supervisors.	
Notes for reference					
Goals to be achieved					
To acquire fundamental knowledg	re on individual res	earch fields			
To acquire the ability of finding a			lem and the present	tation skill.	
Evaluation of achievement		, ei eennig ale prez			
Coursework, presentation and/or	report.				
Grades: S: 90–100, A:80–89, B:70					
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A					
Reference URL					
N/A					
Office hours					
N/A					
Relations to attainment objective	es of learning and o	education			

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members

(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

#### (1440600100)14-4---of P & D 1[Methodology of P & D 1]

(M42630100)Methodology of R &	D I [Methodology o	TR&DI]			
Subject name[English]	Methodology of R	& D 1[Methodology	/ of R & D 1]		
Schedule number	M42630100	Subject area	Advanced	Required or	Elective
			Electrical and	elective	
			Electronic		
			Information		
			Engineering		
Time of starting a service	Eall tarms	Day of the	5 5	Credit(s)	2
Time of starting a course	Fall term	Day of the	Tue.3~3	Great(s)	2
		week,period			
Faculty		n for Master's Degr		Subject grade	1~
Department Offered	Electrical and Ele	ctronic Information	Engineering	Beggining	M1
				grade	
Charge teacher name[Roman	S2系教務委員 2I	kei kyomu Iin−S			
alphabet mark]					
Numbering	ELC_MAS58025				
Objectives of class					
	ala undavatandina .	of DPD mothedale.		المعارمة والمعار	unin information
The class aims to provide a ba			gy related to the e	lectrical and elect	ronic information
engineering for the research work	t of his/her master	thesis.			
Contents of class					
The class provides some fundam	ental tips to condu	ct R&D work effec	tively. Contents of t	the class depend o	n the supervisor.
To be announced by individual su					
To be announced by multidual su					
Self Preparation and Review					
N/A					
Related subjects					
N/A					
Notes for textbook					
Reference and material will be av	ailable from the cur	envisor			
Notes for reference	allable from the sup	iervisor.			
N/A					
Goals to be achieved					
To acquire the ability of identif	ying and formulatir	ng research proble	m, planning and imp	plementing specific	research tasks,
troubleshooting and communicati	ng outcomes.				
Evaluation of achievement					
Coursework and presentation are	evaluated generally	/.			
Grades: S: 90−100, A:80−89, B:70					
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A					
Reference URL					
N/A					
Office hours					
N/A					
Relations to attainment objective	o of looming and o	ducation			
Relations to attainment objective	is of learning and e	ucation			
(C) Practical and creative skills to	o utilize advanced k	nowledge in an inte	grated manner		
Have advanced knowledge about			0	as related fields: h	ave the practical
			0		ato dio practical
and creative skills to utilize such				ا باب ابین اممانشه	ania informatio
(C1) Have the skills to volunt			-	ectrical and electr	orlic information
engineering as well as related field		-	-		
(C2) Have the skills to learn, b	by experience, met	hodologies for res	earch and developr	nent through integ	grating extensive
knowledge about electrical and e	electronic informati	on engineering as	well as related field	ls; to make plans <sup>·</sup>	for research and
development and put them into p	ractice; and to crea	te new technologie	s to solve problems		

## (M42630130)Material Science for Electronics 2[Material Science for Electronics 2]

Subject name[English]	Material Science	ofor Electronics 2[Ma	aterial Science for E	Electronics 2	
Schedule number	M42630130	Subject area	Advanced	Required or	Elective
			Electrical and	elective	
			Electronic		
			Information		
			Engineering		
Time of starting a course	Fall term	Day of the	Mon.5~5	Credit(s)	2
		week,period	1011.0 0		2
Faculty	Graduate Progra	m for Master's Degre		Subject grade	1~
Department Offered		ectronic Information		Beggining	M1
			Lingineering	grade	
Charge teacher name[Roman	内田 裕久, 人	八井 崇,中村 加	進一,河村 剛 U(	CHIDA Hironaga,	VATSI II Takashi
alphabet mark]		chi, KAWAMURA Go	רויין ניןיניא, ב <u>א</u> וי ש	OnidA Thronaga,	
Numbering	ELC_MAS52025				
-					
Objectives of class		<b>6</b>			
Objective of this subject is to	learn about the f	orefront research ar	nd development on	spin electronics,	thermelectronics
plasmonics and optoelectronics.					
Contents of class					
thermodynamics and transport p	henomena.			ctric energy conv	ersion based on
<ul> <li>You will learn about advanced thermodynamics and transport pl</li> <li>1) thermodynamics and materials</li> <li>3. Plasmonics and optoelectronic</li> <li>You will learn about materials use</li> <li>1) fundamentals of surface plasm</li> <li>4. Nanophotonics</li> <li>You will learn about nanophotoni</li> </ul>	henomena. s processing, 2) fun cs ed in plasmonics ar non resonance, 2) <i>A</i>	damentals of thermo nd optoelectronic dev Advanced optoelectro	electronics. vices.	stric energy conv	ersion based or
<ul> <li>thermodynamics and transport pi</li> <li>1) thermodynamics and materials</li> <li>3. Plasmonics and optoelectronic</li> <li>You will learn about materials use</li> <li>1) fundamentals of surface plasm</li> <li>4. Nanophotonics</li> </ul>	henomena. s processing, 2) fun os ed in plasmonics ar non resonance, 2) A c materials and dev	damentals of thermo nd optoelectronic dev Advanced optoelectro <i>v</i> ices.	electronics. vices.	stric energy conv	ersion based or
<ul> <li>thermodynamics and transport pi</li> <li>1) thermodynamics and materials</li> <li>3. Plasmonics and optoelectronic</li> <li>You will learn about materials use</li> <li>1) fundamentals of surface plasm</li> <li>4. Nanophotonics</li> <li>You will learn about nanophotonic</li> </ul>	henomena. s processing, 2) fun os ed in plasmonics ar non resonance, 2) A c materials and dev	damentals of thermo nd optoelectronic dev Advanced optoelectro <i>v</i> ices.	electronics. vices.	ctric energy conv	ersion based or
thermodynamics and transport p 1) thermodynamics and materials 3. Plasmonics and optoelectronic You will learn about materials us 1) fundamentals of surface plasm 4. Nanophotonics You will learn about nanophotoni 1) nanophotonic matreials and 2) Self Preparation and Review Related subjects	henomena. s processing, 2) fun os ed in plasmonics ar non resonance, 2) A c materials and dev	damentals of thermo nd optoelectronic dev Advanced optoelectro <i>v</i> ices.	electronics. vices.	ctric energy conv	ersion based or
thermodynamics and transport p 1) thermodynamics and materials 3. Plasmonics and optoelectronic You will learn about materials us 1) fundamentals of surface plasm 4. Nanophotonics You will learn about nanophotoni 1) nanophotonic matreials and 2) Self Preparation and Review Related subjects N/A	henomena. s processing, 2) fun os ed in plasmonics ar non resonance, 2) A c materials and dev	damentals of thermo nd optoelectronic dev Advanced optoelectro <i>v</i> ices.	electronics. vices.	stric energy conv	ersion based or
thermodynamics and transport p 1) thermodynamics and materials 3. Plasmonics and optoelectronic You will learn about materials use 1) fundamentals of surface plasm 4. Nanophotonics You will learn about nanophotonic 1) nanophotonic matreials and 2) Self Preparation and Review Related subjects N/A Notes for textbook	henomena. s processing, 2) fun cs ed in plasmonics ar non resonance, 2) A c materials and dev nanophotonic devi	damentals of thermo nd optoelectronic dev Advanced optoelectro <i>v</i> ices.	electronics. vices.	stric energy conv	ersion based or
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# Other information

Spin electronics: Hironaga Uchida: uchida@ee.tut.ac.jp Thermoelectronics: Yuichi Nakamura: nakamura@ee.tut.ac.jp Plasmonics and optoelectronics: Go Kawamura: gokawamura@ee.tut.ac.jp Nanophotonics: Takashi Yatsui: yatsui.takashi.rv@tut.jp **Reference URL** 

N/A

# Office hours

Please make an appointment via e-mail.

Relations to attainment objectives of learning and education

(C)高度な知識を統合的に活用できる実践力・創造力
 電気・電子情報工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践
 的・創造的能力を身につけている。
 (C1) 電気・電子情報工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills toutilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner

# Key words

magnetics, thermelectronics, plasmonics and optoelectronics, nanophotonics

#### (M42630170)Electrical Energy Systems 2[Electrical Energy Systems 2]

Subject name[English]	Electrical Energy S	Systems	s 2[Ele	ectrica	l Energy Syst	ems 2	]		
Schedule number	M42630170	Subjec	st are	a	Advanced		Required	or	Elective
					Electrical	and	elective		
					Electronic				
					Information				
					Engineering				
Time of starting a course	Fall term	Day	of	the	Mon.4~4		Credit(s)		2
		week,p	period						
Faculty	Graduate Program	for Ma	ster's	Degre	e		Subject grad	e	1~
Department Offered	Electrical and Elec	ctronic I	nform	ation	Engineering		Beggining		M1
							grade		
Charge teacher name[Roman	穗積 直裕,滝川	浩史 H	ozun	/INao	hiro, TAKIKAV	VA Hir	ofumi		
alphabet mark]									
Numbering	ELC_MAS53025								

# Objectives of class

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

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

# **Contents of class**

Sub Course 1

- 1. Phenomena of ionized gas
- 2. Characteristics of discharge plasma
- 3. Recent trend in plasma applications
- Sub Course 2
- 1. Energy propagation thorough distributed medium.
- 2. Diagnosing techniques for industrial and biomedical matters.
- 3. Assessment for high voltage insulation system for power use.
- Sub Course 1
- 1. Phenomena of ionized gas
- 2. Characteristics of discharge plasma
- 3. Recent trend in plasma applications
- Sub Course 2
- 1. Energy propagation thorough distributed medium.
- 2. Diagnosing techniques for industrial and biomedical matters.
- 3. Assessment for high voltage insulation system for power use.

# Self Preparation and Review

### **Related** subjects

Electric Power Systems, Dielectrics and Electrical Insulation, Energy Conversion, Plasma Science Electric Power Systems, Dielectrics and Electrical Insulation, Energy Conversion, Plasma Science

#### Notes for textbook

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

# Notes for reference

#### Goals to be achieved

To understand the basic knowledge of electric enrgy systems and related fields.

To understand the basic knowledge of electric enrgy systems and related fields.

# **Evaluation of achievement**

Marks are based on the final examination or report (100%).

Marks are based on the final examination or report (100%).

# Examination

定期試験を実施(対面)

Examination(Face to Face)

# Details of examination

# Other information

Office: C-309, TEL: 0532-44-6958, E-mail: hozumi.naohiro.uv@tut.jp Office: C-309, TEL: 0532-44-6958, E-mail: hozumi.naohiro.uv@tut.jp **Reference URL** 

# Office hours

Before and/or after the lecture and at any time after making the appointment based on e-mail. Before and/or after the lecture and at any time after making the appointment based on e-mail. **Relations to attainment objectives of learning and education** 

Key words

Electric Energy, Electric Power, High Voltage, Secondary Battery, Plasma, Electrical Insulation Electric Energy, Electric Power, High Voltage, Secondary Battery, Plasma, Electrical Insulation

# (M42630210)Semiconductor Physics 2[Semiconductor Physics 2]

Subject name[English]	- Semiconductor P	hysics 2[S	micondu	ictor Physics 2]		
Subject name[English] Schedule number	M42630210	-		Advanced	Doguinad	Flective
Schequie number	WI42030210	Subject	area		Required or	Elective
				Electrical and	elective	
				Electronic		
				Information		
				Engineering		
Time of starting a course	Fall term	Day o	f the	Mon.2~2	Credit(s)	2
		week,per				
Faculty	Graduate Progran	n for Maste	er's Degr	ee	Subject grade	1~
Department Offered	Electrical and Ele	ctronic Info	ormation	Engineering	Beggining	M1
					grade	
Charge teacher name[Roman	若原 昭浩,岡	田浩,河	「野 剛	士,髙橋 一浩 W/	AKAHARA Akihiro,	OKADA Hiroshi,
alphabet mark]	KAWANO Takesh	i, TAKAHA	SHI Kazı	ihiro		
Numbering	ELC_MAS54025					
Objectives of class						
先端的な半導体デバイスのための	の理論、デバイス構	造、設計や	作製プロ	ロセスを理解すること	-を目標とする。	
To understand semiconductor phy						
Contents of class		0 / 1		,		
この科目は前半と後半の2つの部	3分から構成される。	前半では	nn 接合	や MOS 構造におけ	る多数および少数	キャリアの振る舞
いについて扱う。注入された少数						
る。		))(iC )(i	СОЛДЛ			
00						
1. ナノ構造デバイスの作製および						
2. バンドエンジニアリングと量子家						
3. 先端 MEMS/NEMS 技術(河野,	高橋)					
講義に加えて学生が主体的に取	り組むケーススタデ	イも実施す	る。学生	は与えられた課題	についての調査研究	<b>宅や、要求を満足</b>
するデバイスを設計するなどの課	題に取り組み、プレ	/ゼンテーシ	ョンを行	う。		
授業の進め方は、受講学生の学	翌宿麻わ高講学生	し物たみて	动里的	た学習が進められ	ス形式で行う	
本学の新型コロナウィルス感染拡						「市が生」「ス提会
本生の新型コロノウィルへ恐来症があります。		国を中の	友丈に日	い、反未内谷のよい	アル限の計画/ム1〜3	え更かエレる物ロ
	. The first half he	aina hu int	م مار به انه م	materily - and using	uitu — e euri eur le ele euri.	u in fundamental
This subject consists of two part			-		-	
pn-junction and MOS structures		carrier dy	namics i	n semiconductors	is also included. O	n the latter half,
student choose one from followin	g topics.					
1. Fabrication and characterizatio				es (Prof. Okada)		
2. Band engineering and quantum						
3. Advanced MEMS/NEMS technology	ologies(Prof. Kawan	o, Prof. Ta	kahashi)			
Adding to lectures by professors	s, in this subject, a	a case stu	dy is als	o conducted. Name	ely, students are re	equired to give a
presentation on researches on th	e given topics, and	on design	of device	s that satisfies req	uired specifications.	
					·	
The class will be conducted so a	s to achieve effect	ive learnin	a bacad	on the learning hist	on of the students	and the number
of students taking the class.	s to achieve effect		g baseu		ory of the students	
If there will be any changes regard	ding Tayahaahi Uni	voraity of T	Taabaala	m. Activity Postrict	iona Laval for	
Preventing the Spread of Corona	•••	•				<b>70</b>
Self Preparation and Review			evaluati			g0.
ちになし 特になし						
N/A						
Related subjects						
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solid-state physics, basic of semi	conductor physics,	quantum n	rechanic	s, mermoaynamics,	and electronics	
solid-state physics, basic of semi	conductor physics.	quantum n	nechanic	s, thermodynamics.	and electronics	
	, , ,,			,,		

# Notes for textbook

S.M.Sze, Physics of Semiconductor Devices (Wiley)

関連する参考文献やデータ、資料などは講義で配布する。 S.M.Sze, Physics of Semiconductor Devices (Wiley)

Related references, data, printed matters will be given in the class.

# Notes for reference

特になし N/A

### Goals to be achieved

1. 半導体における基本的な物理現象を深く理解し、基本的な半導体デバイスの動作原理を修士課程学生に説明できること
 2. 与えられた要求仕様を満足する半導体デバイスの基本部分を設計することができること

3. 与えられたトピックスを調査し、講義できること

You will be able to:

1. Deeply understand fundamental phenomena in semiconductors, and explain operation principle of basic semiconductor devices to master course students.

2. Design a essential part of semiconductor devcie that satisfies the given specification.

3. Investigate on given topics, and give a lecture on this.

# Evaluation of achievement

ケーススタディや研究調査の完成度で評価する。 Achievenemt of lectures of the case study, and writing research reports.

Examination

レポートで実施 By Report

#### Details of examination

特になし

N/A

# **Other information** 選択に際しては下記の教員にコンタクトすること。

若原昭浩:C-608 wakahara[at]ee.tut.ac.jp 岡田浩:B-306 okada[at]las.tut.ac.jp 河野剛士:C-603 kawano[at]ee.tut.ac.jp 高橋一浩:C-606 takahashi[at]ee.tut.ac.jp

Before choosing a sub-course, contact to following professors

Akihiro Wakahara:C-608 wakahara[at]ee.tut.ac.jp Hiroshi Okada:B-306 okada[at]las.tut.ac.jp Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp Kazuhiro Takahashi:C-606 takahashi[at]ee.tut.ac.jp

## **Reference URL**

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

#### Office hours

メール等でアポイントを取ってください。 Take an appointment by e-mail.

# Relations to attainment objectives of learning and education

(C)高度な知識を統合的に活用できる実践力・創造力

電気・電子情報工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創造的能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

# Key words

Solid-state electronics, semiconductor physics, laser diode, low-dimensional quantum devices Solid-state electronics, semiconductor physics, laser diode, low-dimensional quantum devices

## (M42630270)Advanced Electronic Information System 2[Advanced Electronic Information System 2]

Subject name[English]	Advanced Electro	nic Informati	ion Sys	tem 2[Advanced E	electronic Informatio	n System 2]
Schedule number	M42630270	Subject ar	ea	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective
Time of starting a course	Fall term	Day of week,perio	the d	Mon.1~1	Credit(s)	2
Faculty	Graduate Program	for Master'	s Degre	e	Subject grade	1~
Department Offered	Electrical and Elec	ctronic Infor	mation	Engineering	Beggining grade	M1
Charge teacher name[Roman alphabet mark]	市川 周一,田村	昌也 ICHIK	AWA S	huichi, TAMURA N	lasaya	
Numbering	ELC_MAS55025					

The aims of this lecture:

(1) To understand various topics on logic design and computer aided design (CAD),

(2) To understand the role and design of microwave circuits used in wireless systems.

# Contents of class

This lecture consists of two themes shown below.

(1) As a result of recent progresses in VLSI technology, the complexity of digital circuit has rapidly increased in these years. Computer-aided design (CAD) is now essential to design logic circuit. This lecture introduces various CAD tools and the algorithms for CAD.

(face-to-face)Week 1: LSI design and CAD(on-demand)Week 2: Logic synthesis(face-to-face)Week 3: Layout(on-demand)Week 4: Timing analysis(on-demand)Week 5: Logic simulation(face-to-face)Week 6: Verification(on-demand)Week 7: Test

(face-to-face) Week 8: Examination

(2) The aim of this course is to acquire the knowledge and design techniques of microwave circuits used in wireless systems.

(face-to-face) Week 1: Transmission line and propagation modes
(on-demand) Week 2: Practical questions
(face-to-face) Week 3: Coupled line and its application
(on-demand) Week 4: Practical questions
(face-to-face) Week 5: Antenna and filter design
(on-demand) Week 6: Practical questions
(on-demand) Week 7: Other application circuits and Practical questions
(face-to-face) Week 8: Examination

#### \_\_\_\_\_

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

#### Self Preparation and Review

It is strongly recommended to prepare the lecture, e.g., to read the course materials and references before attending the corresponding lecture. Average preparation time is 90 minutes.

It is also recommended to review after the lecture. Average review time is 90 minutes.

The course materials and references will be shown by the lecturer whenever necessary.

#### Related subjects

Prerequisite (2): Fundamental Knowledge and skills of high-frequency circuit, electromagnetism, and electromagnetic wave engineering. Notes for textbook No textbooks are assigned. Notes for reference N/A Goals to be achieved (1) To understand various CAD tools and the algorithms for CAD, (2) To understand the role and design of microwave circuits used in wireless systems. Evaluation of achievement Item (1) 50%, Item (2) 50% Examination 定期試験を実施(対面) Examination(Face to Face) **Details of examination** TBD Other information (1) Shuichi Ichikawa, Room C-404, ext. 6897, E-mail: ichikawa@tut.jp (2) Masaya Tamura, Room C-405, ext. 6754, E-mail: tamura@ee.tut.ac.jp **Reference URL** http://www.ccs.ee.tut.ac.jp/~ichikawa/lecture/ http://www.comm.ee.tut.ac.jp/em/index\_en.html **Office hours** Please make an appointment for consultation with the lecturer via e-mail or direct communication in classroom. Relations to attainment objectives of learning and education 電気·電子情報工学専攻 (C)高度な知識を統合的に活用できる実践力・創造力 電気・電子情報工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践 的・創造的能力を身につけている。 (C1) 電気・電子情報工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につ けている。 Graduate Program of Electrical and Electronic Information Engineering for Master's Degree (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills toutilize such knowledge for problem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner Kev words (1) Logic design, algorithm (2) Microwave circuit, electromagnetic wave engineering

Prerequisite (1): Fundamental knowledge and skills of logic design, algorithms, and computer structure.

Subject name[English]	Seminar on C Engineering I]	Computer Science an	d Engineering I[Se	eminar on Compu <sup>.</sup>	ter Science
Schedule number	M43610010	Subject area	Advanced Computer Science and Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week.period	Intensive	Credit(s)	4
Faculty	Graduate Prog	ram for Master's Degre	e	Subject grade	1~
Department Offered	Computer Scie	nce and Engineering		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員	. 3kei kyomu Iin−S		5.000	<u> </u>
Numbering	CMP_MAS5101	5			
技術情報を理解、説明、質疑・応 The course is intended for stud science and engineering. It is also aimed for students to a and technical discussion and writ	dents to study b	basic materials in dep			
教員が指定する内容に関し、予習 Consult with your advisor. Related subjects 指導教員に問い合わせること。 Consult with your advisor. Notes for textbook 指導教員に問い合わせること。 Consult with your advisor.	3・復習を行う。 				
Notes for reference					
Goals to be achieved (1)最先端の専門分野の英文が (2)技術的な情報を扱う英文が解 (3)論文の標準的な構成ができる (4)発表というスタイルでの情報 (5)情報の不足を質問という形式 (1) To understand English literatu (2) To interpret technical informa (3) To make a standard construct (4) To provide information by ora (5) To point out the lack of inform	解でき、作文でき る。 それができる。 で指摘できる。 ire on state-of-t tion written in Er tion of a technica I presentation.	きる。 he-art areas of expert nglish, and to write suc al paper.		-	
<b>Evaluation of achievement</b> 技術情報の発見に向けた自主性 導教員が判定する。	、技術情報の理	解度、説明の方法、質	[問への回答、議論	への参加の様子等	<b>テから総合的</b>

# 試験期間中には何も行わない

None during exam period

**Details of examination** 課題レポートやプレゼンテーションに基づいて評価する。 Your supervisor will evaluate your presentation and your reports. **Other information** 

Reference URL

# Office hours

指導教員に問い合わせること。

Consult with your advisor.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(M43610020)S πΓς **n**7

Subject name[English]	Seminar on Con Engineering II]	nputer Science and	d Engineering II[Se	eminar on Compu	ter Science an
Schedule number	M43610020	Subject area	Advanced Computer Science and Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	2
Faculty Department Offered		n for Master's Degre e and Engineering	e	Subject grade Beggining grade	2~ M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3I	kei kyomu Iin−S			
Numbering	CMP_MAS61015				
各研究室が指定する情報学に関 技術情報を理解、説明、質疑・応 The course is intended for stuc science and engineering. It is also aimed for students to a and technical discussion and writ	答できる能力を養う dents to study bas acquire various skil	sic materials in dep	th, related to his/I	ner research subje	ects in compute
Related subjects 指導教員に問い合わせること。 Consult with your advisor. Notes for textbook					
授業にて指定する。 Consult with vour advisor.					
Notes for reference					
<ol> <li>(1)最先端の専門分野の英文が第</li> <li>(2)技術的な情報を扱う英文が解</li> <li>(3)論文の標準的な構成ができる。</li> <li>(4)発表というスタイルでの情報損</li> <li>(5)情報の不足を質問という形式</li> <li>(1) To understand English literatud</li> <li>(2) To interpret technical information</li> <li>(3) To make a standard construct</li> <li>(4) To provide information by oral</li> </ol>	解釈でき、作文できる る。 提供ができる。 で指摘できる。 irre on state-of-the- ition written in Engli tion of a technical p	5₀ −art areas of experti ish, and to write suc	· ·		
(5) To point out the lack of inform <b>Evaluation of achievement</b> 技術情報の発見に向けた自主性 導教員が判定する。	nation by questions		問への回答、議論	への参加の様子等	手から総合的に打
Will be evaluated by taking into a involvements and so on.	account various fac	stors overall, such a	s technical explana	tion, question ansv	vering, discussio

Grade levels are S(90% or over), A(80%-less than 90%), B(70%-less than 80%) and C(60%-less than 70%) **Examination** 

試験期間中には何も行わない

None during exam period

**Details of examination** 試験期間中には何も行わない

Non during exam period

Other information

指導教員に問い合わせること。 Consult with your advisor.

Reference URL

# Office hours

指導教員に問い合わせること。 Consult with your advisor.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

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

Subject name[English]	Thesis Research	on Co	mpute	er Sci	ence and Ei	ngineer	ing[Thesis R	esear	ch on Computer
	Science and Engir	neering]							
Schedule number	M43610030	Subje	ct are	a	Advanced		Required	or	Required
					Computer		elective		
					Science	and			
					Engineering	g			
Time of starting a course	2Years	Day	of	the	Intensive		Credit(s)		6
		week,	perioc	1					
Faculty	Graduate Program	n for Ma	ster's	Degre	e		Subject gra	de	1~1
Department Offered	Computer Science	e and E	nginee	ering			Beggining		M1, M2
							grade		
Charge teacher name[Roman	S3系教務委員, 3	系各教	[員 3k	ei kyoi	mu Iin−S, 3ke	i kakuk	kyouin		
alphabet mark]									
Numbering	CMP_MAS61015								

# Objectives of class

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

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

# Contents of class

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

Consult with your advisor for any further details.

#### Self Preparation and Review

Consult with your advisor for them.

Related subjects

Consult with your advisor for them.

# Notes for textbook

Consult with your advisor for them.

# Notes for reference

#### Goals to be achieved

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

# Evaluation of achievement

Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records, master thesis, and oral presentation. It will be then finalized by the faculty meeting.

[Evaluation basis] Students who attend this class will be evaluated as follows:

- S: Achieved the high level of "master degree", 90 or higher (out of 100 points).
- A: Left something to be desired, 80 or higher (out of 100 points).
- B: Left something to be desired, 70 or higher (out of 100 points).
- C: Left much to be desired, 60 or higher (out of 100 points).

Examination

試験期間中には何も行わない

# None during exam period

# Other information

**Reference URL** 

# Office hours

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

(D)グローバルに活躍できるコミュニケーションカ

グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で、自らの考えや成果を効果的に表現するコミュニケーション力を身につけている。

(D1) 論文, 口頭及び情報メディアを通じて, 自分の論点や考えなどを国の内外において効果的に表現・発信し, コミュニケーションする能力を身につけている。

(D2) チーム内の個々の要員の価値観を互いに尊重するとともに、協調して、チームとしての目標達成に寄与できる高い能力を 身につけている。

(E)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計画し学習する能力を身につけている。

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changesin society, environment and technology

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

Subject name[English]	Thesis Research	on Co	mpute	er Sci	ence and Ei	ngineer	ing[Thesis R	esear	ch on Computer
	Science and Engir	neering]							
Schedule number	M43610030	Subje	ct are	a	Advanced		Required	or	Required
					Computer		elective		
					Science	and			
					Engineering	g			
Time of starting a course	2Years	Day	of	the	Intensive		Credit(s)		6
		week,	perioc	1					
Faculty	Graduate Program	n for Ma	ster's	Degre	e		Subject gra	de	1~1
Department Offered	Computer Science	e and E	nginee	ering			Beggining		M1, M2
							grade		
Charge teacher name[Roman	S3系教務委員, 3	系各教	[員 3k	ei kyoi	mu Iin−S, 3ke	i kakuk	kyouin		
alphabet mark]									
Numbering	CMP_MAS61015								

# Objectives of class

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

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

# Contents of class

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

Consult with your advisor for any further details.

#### Self Preparation and Review

Consult with your advisor for them.

#### Related subjects

Consult with your advisor for them.

# Notes for textbook

Consult with your advisor for them.

# Notes for reference

#### Goals to be achieved

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

# Evaluation of achievement

Three faculty members will be assigned to prepare the evaluation for your thesis research, based on publication records, master thesis, and oral presentation. It will be then finalized by the faculty meeting.

[Evaluation basis] Students who attend this class will be evaluated as follows:

- S: Achieved the high level of "master degree", 90 or higher (out of 100 points).
- A: Left something to be desired, 80 or higher (out of 100 points).
- B: Left something to be desired, 70 or higher (out of 100 points).
- C: Left much to be desired, 60 or higher (out of 100 points).

Examination

試験期間中には何も行わない

# None during exam period

# Other information

**Reference URL** 

# Office hours

# Relations to attainment objectives of learning and education

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

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

		-	ence and Engineer	ing[Thesis Resear	ch on Compute
Oakadala mumbar	Science and Engi	1	Adversed	De sudare de la sur	De muine d
Schedule number	M4361003T	Subject area	Advanced	Required or elective	Required
			Computer Science and	01001140	
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	6
		week,period			
Faculty	_	n for Master's Degre	e	Subject grade	2~2
Department Offered	Computer Science	e and Engineering		Beggining grade	M2
Charge teacher name[Roman	S3系教務委員,:	3系各教員 3kei kyo	mu Iin−S, 3kei kakuk		I
alphabet mark]					
Numbering	CMP_MAS61015				
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 compute
science and engineering.					
It is also aimed for students to a	acquire various ski	lls, required in gene	ral research work, s	such as those for o	oral presentatio
and technical discussion and writ	ing.				
Contents of class					
While specific contents depend	on the research a	reas students are i	nvolved in. it is usu	ally the case for	students to rea
relevant textbooks/research pape				-	
Self Preparation and Review	<u> </u>	·····, · · · · · · · ·			
After the guidance by an individ	dual adviser, the s	student is expected	to conduct his/he	er research on his	/her own with
pioneering spirit.					,
Related subjects					
Consult with your advisor.					
Consult with your advisor.					
Notes for textbook					
Consult with your advisor.					
Notes for reference					
Goals to be achieved					
	readings in English,	logical thinking/exp	lanation, and clear p	presentation.	
To acquire abilities for technical i	readings in English,	logical thinking/exp	lanation, and clear p	presentation.	
To acquire abilities for technical I Evaluation of achievement			· · ·		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a			· · ·		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a			· · ·		vering, discussio
To acquire abilities for technical in <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on.	account various fac	stors overall, such a	s technical explana		vering, discussio
To acquire abilities for technical a <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who	account various fac	ill be evaluated as fo	is technical explana		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma	account various fac attend this class wi ister degree", 90 or	otors overall, such a ill be evaluated as fo r higher (out of 100	is technical explana		vering, discussio
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To acquire abilities for technical in <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "madering to be desired, 5 B: Left something to be desired, 5 Comparison of the second	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical a <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
Evaluation of achievement Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or C: Left much to be desired, 60 or Examination	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない None during exam period	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
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To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない None during exam period	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical ( <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who S: Achieved the high level of "ma A: Left something to be desired, S B: Left something to be desired, G C: Left much to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b>	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical i <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 5 B: Left something to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> <b>Other information</b>	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical ( <b>Evaluation of achievement</b> Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who S: Achieved the high level of "ma A: Left something to be desired, S B: Left something to be desired, G C: Left much to be desired, 60 or <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b>	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio
To acquire abilities for technical i Evaluation of achievement Will be evaluated by taking into a involvements and so on. [Evaluation basis] Students who a S: Achieved the high level of "ma A: Left something to be desired, 6 B: Left something to be desired, 60 or Examination 試験期間中には何も行わない None during exam period Details of examination Other information Reference URL	account various fac attend this class wi aster degree <sup>"</sup> , 90 or 80 or higher (out of 70 or higher (out of	tors overall, such a ill be evaluated as for higher (out of 100 100 points). 100 points).	is technical explana		vering, discussio

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

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

Schedule number	Engineering]			minar on Comput	
	M43610040	Subject area	Advanced Computer Science and Engineering	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2
Department Offered	Computer Scienc	e and Engineering		Beggining grade	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3	kei kyomu Iin−S			
Numbering	CMP_MAS51015				
各研究室が指定する情報学に関 技術情報を理解、説明、質疑・応 The course is intended for stud science and engineering. It is also aimed for students to	答できる能力を養う dents to study bas	。 ic materials in dep	th, related to his/	her research subje	ects in compute
教員が指定する最先端の技術情 教員は技術情報の内容の発見、 While specific contents depend relevant textbooks/research pap Self Preparation and Review 教員が指定する内容に関し、予習 Consult with your advisor.	理解、説明、質疑・J on the research ar ers and report on th	芯答する方法につい reas students are in	て直接指導を行う。 nvolved in, it is usu	ually the case for	
Related subjects 指導教員に問い合わせること。 Consult with your advisor. Notes for textbook 指導教員に問い合わせること。 Consult with your advisor. Notes for reference					

# **Examination** 試験期間中には何も行わない None during exam period

Details of examination

課題レポートやプレゼンテーションに基づいて評価する。

Your supervisor will evaluate your presentation and your reports. Other information

# **Reference URL**

# Office hours

# Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

#### (M43610060)Case Study in Imaging and Light and XR[Case Study in Imaging and Light and XR]

Subject name[English]	Case Study in Ima	aging an	ıd Ligł	nt and	XR[Case Study in I	maging and Ligh	nt ar	nd XR]
Schedule number	M43610060	Subje	ct are	a	Advanced	Required	or	Required
					Computer	elective		
					Science and			
					Engineering			
Time of starting a course	Fall term	Day	of	the	Intensive	Credit(s)		4
		week,	perioc	1				
Faculty	Graduate Program	n for Ma	aster's	Degre	e	Subject grade	,	2~2
Department Offered	Computer Science	e and E	nginee	ering		Beggining		M2
						grade		
Charge teacher name[Roman	S3系教務委員, 3	系各教	【員 3k	ei kyoı	mu Iin−S, 3kei kaku	kyouin		
alphabet mark]								
Numbering	CMP_MAS51015							

#### Objectives of class

As a stepping stone to a Master's research, a preliminary project involving measurement experiments or system development is carried out under the supervision of a supervisor. After a necessary and sufficient survey of the relevant research, students define the research question, consider the appropriate research methods and discuss the impact of the results obtained. A presentation opportunity is given at the end of the semester to exchange the ideas among other students and supervisors. Master's research may be carried out by improving/expanding the project.

#### Contents of class

The project theme is initially presented as a candidate by the supervisors and is finally decided through discussion with the students.

#### Self Preparation and Review

Consult with you<u>r advisor.</u>

Related subjects

Consult with your advisor.

#### Notes for textbook

Consult with your advisor.

# Goals to be achieved

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

#### Evaluation of achievement

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

[Evaluation basis] Students who attend this class will be evaluated as follows:

S: Achieved the high level of "master degree", 90 or higher (out of 100 points).

- A: Left something to be desired, 80 or higher (out of 100 points).
- B: Left something to be desired, 70 or higher (out of 100 points).

C: Left much to be desired, 60 or higher (out of 100 points).

# Examination

試験期間中には何も行わない

None during exam period **Details of examination** 

Your supervisor will evaluate your presentation and your reports.

Other information

# **Reference URL**

Office hours

Consult with your advisor.

# Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

# (M43610070)Advanced Research Methods[Advanced Research Methods]

Subject name[English]	Advanced Resear	rch Methods[Advand	ed Research Metho	ods]	
Schedule number	M43610070	Subject area	Advanced	Required or	Required
			Computer	elective	
			Science and		
			Engineering		
Time of starting a course	Fall term	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	2~2
Department Offered		e and Engineering		Beggining grade	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員, :	3系各教員 3kei kyo	mu Iin−S, 3kei kakuł		
Numbering	CMP_MAS61015				
Objectives of class					
The course is intended for stude	nts to study basic r	materials in depth, re	elated to his/her re	search topics throu	igh the lab works
It is also aimed for students to a	-				-
presentation, and technical discu	ssion and writing.				
Contents of class					
While specific contents depend	on the research to	opics students are i	nvolved in, it is us	ually the case for	students to rea
relevant textbooks/research pap	ers and report on t	hem, as well as to p	resent and discuss	on the research wo	rk of their own.
Self Preparation and Review					
Consult with your advisor.					
Related subjects					
Consult with your advisor.					
Consult with your advisor.					
	search and develop	oment at technically	<sup>,</sup> high level, sophist	icated decision ma	king, and leadin
Consult with your advisor. Notes for reference Goals to be achieved To acquire abilities for doing res	search and develop	oment at technically	<sup>r</sup> high level, sophist	icated decision ma	king, and leadin
Consult with your advisor. Notes for reference Goals to be achieved To acquire abilities for doing res large scale research projects.	search and develop	oment at technically	<sup>7</sup> high level, sophist	icated decision ma	king, and leadin
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(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

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(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

# (M43610080)Data Science and Analysis 1[Data Science and Analysis 1]

O a la statuta su statut		e and Analysis 1[Da			Den de l	Denni
Schedule number	M43610080		Subject area	Advanced Computer Science and	Required or elective	Required
Time of starting a course	Fall1 term		Day of the week,period	Engineering Mon.2~2	Credit(s)	1
Faculty	Graduate Pr	ogram for Master's			Subject grade	2~2
Department Offered	Computer Se	cience and Enginee	ring		Beggining grade	M2
Charge teacher name[Roman alphabet	秋葉 友良 /	AKIBA Tomoyoshi				
mark]						
Numbering Objectives of class	CMP_MAS52	2525				
Contents of class Week 1: (face-to-face) Week 2: (on-demand) L Week 3: (on-demand) P Week 4: (on-demand) P Week 5: (on-demand) P Week 6: (on-demand) P Week 8: (on-demand) P Week 8: (on-demand) P	ecture (Basic c Presentation & I Presentation & I Presentation & I Presentation & I Presentation & I	Discussion (Statisti Discussion (Langua, Discussion (Transla Discussion (Parame Discussion (EM Alg Discussion (Advanc	cal Method for Ma ge Models) ition Models) eter Estimation) orithm) eed methods in SM	achine Translation) IT)		r Preventing t
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and parameter estimation methods, Applications: Understand statistical machine translation system.

#### Evaluation of achievement

Marks are based on the submitted materials (presentation) and the activity in the class (100%).

**Examination** 授業を実施 Regular Class

Details of examination

N/A

#### Other information

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

**Reference URL** 

N/A

Office hours

16:25-17:40, Tuesday

Relations to attainment objectives of learning and education

 (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。
 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

spoken language processing, natural language processing, human language technology

# (M43610090)Data Science and Analysis 2[Data Science and Analysis 2]

	Data Science and	Analysis 2[Data Sc	ience and Analysis	2]	
Schedule number	M43610090	Subject area	Advanced	Required or	Required
			Computer	elective	
			Science and		
			Engineering		
Time of starting a course	Fall2 term	Day of the week,period	Mon.2~2	Credit(s)	1
Faculty	Graduate Progran	n for Master's Degre	e	Subject grade	2~2
Department Offered	Computer Science	e and Engineering		Beggining grade	M2
Charge teacher name[Roman	栗山 繁,青野 邪	推樹 KURIYAMA Shi	geru, AONO Masaki	Biado	
alphabet mark]					
Numbering	CMP_MAS52325				
<b>Objectives of class</b> 本講義では、大規模または多次元 なデータ分析のワークフローを設言 This class teaches the design me size or dimension of dataset. Prac	計する制作実習に。 thodology of deve	よって、実践的な応り loping data explora	用開発力を習得する tion tools by efficie	oontly and effectively	visualizing huge
Contents of class					
(オンデマンド)第1週目:情報可将 (オンデマンド)第2週目:相関の可 (オンデマンド)第3週目:構造の可 (オンデマンド)第3週目:構造の可 (オンデマンド)第5週目:テキスト・ (オンデマンド)第6週目:ワークフロ (対面)第7+0.5週目:制作課題発 本学の新型コロナウィルス感染拡 があります。 (On-demand) Week 1. Introduction (On-demand) Week 2. Correlation (On-demand) Week 2. Correlation (On-demand) Week 3. Relation vis (On-demand) Week 3. Relation vis (On-demand) Week 4. Visualization (On-demand) Week 5. Visualization (On-demand) Week 5. Visualization (On-demand) Week 6. Design of w (Face to face) Week 7+0.5: Preser if there will be any changes reg Spread of Corona virus, the cours <b>Self Preparation and Review</b> 予習: Google Classroom 上に公開	視化1(多変量デー 視化(木構造・ネッ 視化2(Glyph 表示 変動の可視化と対 ローの設計 表 大防止のための活 n and overview of in visualization of mu cualization with tree n of correlation usi n of textual inform orkflow ntation of exercise (arding Toyohashi e content and eval	ータ) 小ワーク) マ) 話操作 動基準の変更に伴 nformation visualiza litivariate data a and network repre ng glyph ation and time-varia University of Tech uation of achievement トを事前に熟読する	tion sentation ition, and interaction nology Activity Re ent are subject to c	ns strictions Level fo	
To enhance a learning effect, stud	lents are encourag	ed to read a textbo			ound 40 minutes
To enhance a learning effect, stuc Students are encouraged to refer	lents are encourag	ed to read a textbo			ound 40 minutes
To enhance a learning effect, stud Students are encouraged to refer Related subjects	lents are encourag to answer samples	ed to read a textbo			ound 40 minutes
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復習; Google Classroom 上に公開 To enhance a learning effect, stud Students are encouraged to refer Related subjects 数値解析, 多変量解析, データマ・ Numerical analysis, Multivariate ar Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A Goals to be achieved 大規模、多次元のデータを効率的 クフローを設計できる技能を習得す	lents are encourag to answer samples イニング特論 halysis, Advanced [ issroom)に公開す E-learning system	ed to read a textbo s supplied in Google Data Mining る電子テキストを使り of Google Classroo	Classroom for arou 用する. n.	nd 20 minutes.	
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# レポート課題の合計 100 点で採点する。 S:達成目標をすべて達成しており、かつレポート課題の合計点(100 点満点)が 90 点以上 A:達成目標を90%達成しており、かつレポート課題の合計点(100 点満点)が80 点以上 B:達成目標を 75%達成しており, かつレポート課題の合計点(100 点満点)が 70 点以上 C:達成目標を 60%達成しており、かつレポート課題の合計点(100 点満点)が 60 点以上 The score is calculated by the Report(Exercise) of the total of 100 points S: 90 or more, A: 80 or more, B: 70 or more, C: 60 or more Examination レポートで実施 By Report **Details of examination** 特になし N⁄A Other information 特になし N⁄A Reference URL 特になし N⁄A **Office hours** 随時だが、電子メールで予約をとること。 Anytime, but requires reservation by E-mail. Relations to attainment objectives of learning and education 情報·知能工学専攻 (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけて いる。 Graduate Program of Computer Science and Engineering for Master's Degree (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner Key words 情報検索、情報可視化、ビジュアル情報処理 Information visualization, Visual data analytics, Visual information processing

# (M43630240)Networking, Advanced 1[Networking, Advanced 1]

Subject name[English]	Networking, A	Advanced 1[Networki	ing, Advanced 1]			
Schedule number	M43630240		Subject area	Advanced	Required or	Elective
				Computer	elective	
				Science and		
				Engineering		
Time of starting a course	Fall1 term		Day of the week,period	Wed.2~2	Credit(s)	1
Faculty	Graduate Pro	gram for Master's D	egree		Subject grade	1~
Department Offered	Computer Sc	ience and Engineerin	ıg		Beggining grade	M1
Charge teacher	梅村 恭司 U	MEMURA Kyoji				1
name[Roman alphabet						
mark]						
Numbering	CMP MAS52	325				
Objectives of class						
•	alaca ia maata	ring both profound	and advanced n	atworking toobaolog	ion hobind com	putor potwork
The objective of this o					les benind com	puter network
programs. Precise proto	cols are lecture	ed to enhance the kn	iowledge of Interr	iet.		
The objective of this o	class is maste	ring both profound	and advanced n	etworking technolog	ies behind com	puter network
programs Precise proto	cols are lectur	ed to enhance the kr	nowledge of Inter	net.		
Contents of class						
1. Link Layer						
2. Internet Protocol						
3. Address Resolution P	rotocol					
4. Internet Control Mess						
5. IP routing and Dynami	0	ocol				
6. Transmission Control	-					
6. User Datagram Proto		sting				
0. User Datagram Froto		sung				
Class id of Google Class URL of Google Meet is t			MU JOHO SYSTE	EM.		
1. (remote simultaneous		-				
2. (remote simultaneous						
3. (remote simultaneous						
4. (remote simultaneous		-				
5. (remote simultaneous			-			
6. (remote simultaneous						
7. (remote simultaneous	interactiv) Use	r Datagram Protocol	l and Multicasting	5		
If there will be any chan	ges regarding T	oyohashi University	of Technology Ac	ctivity Restrictions L	evel for	
Preventing the Spread o	f Corona virus,	the course content	and evaluation of	<sup>f</sup> achievement are su	bject to change	
(If there is any changes	about a class s	chedule. it will be inf	ormed via Google	e Classroom		
(						
Calf Dranaration and De	view					
Self Preparation and Re						
Related subjects						
The basic knowledge abo	out the structu	re of client/server p	rograms is require	ed.		
The basic knowledge abo	out the structu	re of client/server n	rograms is require	ed.		
Textbook1	Book title	TCP/IP Illustrated	<u> </u>		ISBN	[
				-		
	Author	W. Richard Stevens	Publisher	Addison-wesley	Publish year	
Notes for textbook						
TCP/IP Illustrated Volur	ne. 1, The Prot	ocols,				

W. Richard Stevens, Addison-wesley

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

Required part of this book will be accessible to students.

# Notes for reference

# Goals to be achieved

The goal is to understand precisely the structure of internet protocol with which computer network works. The goal is to understand precisely the structure of internet protocol with which computer network works.

# Evaluation of achievement

By Individual interactive Examination. By Individual interactive Examination.

Examination 定期試験を実施(オンライン) Examination(On line) Details of examination

#### Other information

C-304 umemura@tut.jp

C-304 umemura@tut.jp

# **Reference URL**

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

# Office hours

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

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

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

 (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。
 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Computer Network, Distributed Systems Computer Network, Distributed Systems

# (M43630250)Networking, Advanced 2[Networking, Advanced 2]

Subject name[English]	Networking, Advanced 2[Netw	vorking, Advanced 2]			
Schedule number	M43630250	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Fall2 term	Day of the week,period	Wed.2~2	Credit(s)	1
Faculty	Graduate Program for Master	's Degree		Subject grade	1~
Department Offered	Computer Science and Engine	eering		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	大村 廉 OMURA Ren				
Numbering	CMP_MAS52325				

**Objectives of class** 

The aim of this class is to understand the concepts, system architecture, and algorithm in distributed computing. The class will cover both of theoretical discussion and practical applications.

The contents will focus on advanced topics in distributed systems, namely the knowledge of computer network and basics of distributed systems are required beforehand.

# **Contents of class**

The 1st and 2nd weeks; Concepts of Distributed Systems (Face to face)

The 3rd week; Synchronization(Face to face)

The 4th and 5th weeks; Consistency(Face to face)

The 6th, 7th, and 8th weeks; Fault tolerance(Face to face)

Evaluation will be done by an assignment announced in a class.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for

Preventing the Spread of Coronavirus, the course content and evaluation of achievement are subject to change.

If there are any changes to a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

# Self Preparation and Review

To enhance a learning effect, students are encouraged to refer to the reference book, "Distributed Systems: Principles and Paradigms (2nd Edition)" and to search some keywords in the book on the Internet to find practical examples. To prepare for and review the lecture for around 90 minutes each.

#### Related subjects

Computer Network, Operating Systems, System Programming, (Basics of Distributed Systems)

#### Notes for textbook

The materials referenced in the class will be able to download via Google Classroom or pass out in the class.

Reference1	Book title	Distributed sy	stems	: principles and p	paradigms	ISBN	978-
							0132392273
	Author	Andrew	S.	Publisher	Pearson	Publish	2007
		Tanenbaum,			Prentice Hall	year	
		Maarten	van				
		Steen					

# Notes for reference

Some other related materials, such as books, videos, and web pages, are introduced in the class.

# Goals to be achieved

The aim of this class is to understand;

(1) the basic methods and concepts of synchronization in distributed systems;

(2) the concepts and variations of consistency in distributed systems;

(3) the basic concepts and methods of fault tolerance in distributed systems;

(4) the basic concepts of security in distributed systems;

 $(\mathbf{5})$  and some practical examples of distributed systems.

# Evaluation of achievement

The achievement of students is evaluated by a report assignment. (If the evaluation method is changed, it is announced in the class.)

S: 90 and over

A: 80 and over

B: 70 and over

C: 60 and over

#### Examination

レポートで実施

By Report

#### **Details of examination**

A report related to distributed systems is assigned. (If the evaluation method is changed, it is announced in the class.)

#### Other information

Teacher's Room: C-509 Internal Phone Number: 6750

E-mail: ren@tut.jp

Reference URL

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

#### **Office hours**

You can ask any questions anytime by e-mail. If you come to the teacher's office, you need to have an appointment. **Relations to attainment objectives of learning and education** 

(C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner

Key words

Distributed System, Computer Network, Operating System Distributed System, Computer Network, Operating System

# (M43630470)Data Science and Analysis 1[Data Science and Analysis 1]

Subject name[English]	-					
Schedule number	M43630470		Subject area	Advanced	Required or	Elective
				Computer	elective	
				Science and Engineering		
Time of starting a	Fall1 term		Day of the	Mon.2~2	Credit(s)	1
course			week,period		5.00.000	
Faculty	Graduate Pr	ogram for Master's			Subject	1~
					grade	
Department Offered	Computer S	cience and Enginee	ering		Beggining	M2
<b>a</b>	10 # 누 ㅎ				grade	
Charge teache name[Roman alphabe		AKIBA Tomoyoshi				
name_roman aipnabe mark]						
Numbering	CMP MAS52	2525				
Objectives of class						
Important topics on st	atistical natural	language processin	ng will he discusse	d by focusing on sta	tistical machine	translation
Contents of class		iniguage processin	-5 min be discusse	a sy roousing on sta		a ansiacion.
Week 1: (face-to-face	) Introduction					
Week 2: (on-demand)		of Probability and S	tatistics. Recent	Trends in Machine T	ranslation)	
Week 3: (on-demand)						
Week 4: (on-demand)		•				
Week 5: (on-demand)			0 ,			
Week 6: (on-demand)			•			
Week 7: (on-demand)	Presentation & I	Discussion (EM Alg	orithm)			
Week 8: (on-demand)	Presentation & I	Discussion (Advanc	ed methods in SM	IT)		
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and parameter estimation methods, Applications: Understand statistical machine translation system.

#### Evaluation of achievement

Marks are based on the submitted materials (presentation) and the activity in the class (100%).

**Examination** 授業を実施 Regular Class

Details of examination

N/A

## Other information

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

# **Reference URL**

N/A

Office hours

16:25-17:40, Tuesday

Relations to attainment objectives of learning and education

 (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。
 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

spoken language processing, natural language processing, human language technology

Subject	Robotic Pe	rception and Hum	an-Robot Intera	ction 1[Robotic	Perception an	nd Human-
name[English]	Interaction 1	_ '				ia rianiani
Schedule number	M43630480		Subject area	Advanced	Required or	Elective
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				Science and		
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Faculty	Graduate Pr	ogram for Master's D	egree		Subject	1~
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Numbering	CMP_MAS53	3225				
Objectives of class						
Fundamental and adv	vanced issues in	intelligent robotics	will be discussed.	Topics included a	re: statistical s	ensor fusion
Bayes filters, object	tracking and ide	entification, robotic n	napping and local	ization, observatior	n planning, hum	nan detectio
identification, and tas						
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Contents of class						
Week 1: Introduction,	probability basic	s, and sensor fusion	by Bayesian infer	ence.(face-to-face	)	
Week 2: Object track	ing by Bayesian t	filters.(on-demand)				
Week 3: Mobile robot	localization.(on-	demand)				
Week 4: Mapping and	•		manning)(on-der	hand)		
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Week 5: Observation	planning.(on-den					
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Week 6: Human deteo	ction and identifie	cation.(on-demand)				
Week 6: Human detec Week 7: Task-oriente	ction and identifie	cation.(on-demand)	nd)			
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レポートで実施
By Report
Details of examination
N/A
Other information
Contact: Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)
Reference URL
All materials are delivered by Google Classroom. The class code is: y4umxsb
Office hours
Make an appointment beforehand by email.
Relations to attainment objectives of learning and education
Key words
robotics, sensor fusion, robotic perception, human-robot interaction

Subject name[English]	Robotic Perception and Hu 2]	man-Robot Interaction 2	[Robotic Perceptic	on and Human-	Robot Interactio
Schedule number	M43630490	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a	Fall2 term	Day of the	Tue.3~3	Credit(s)	1
course Faculty	Graduate Program for Mast	week,period ter's Degree		Subject	1~
Department Offered	Computer Science and Eng	ineering		grade Beggining	M1
Charge teacher	大島 直樹, 大村 廉 OSHI	MA Naoki, OMURA Ren		grade	
name[Roman alphabet mark]					
Numbering	CMP_MAS53225				
(オンデマンド)第 2-3 3 (オンデマンド)第 4 週: (オンデマンド)第 5 週: (対面)第 6-7.5 週: 最約 当: 大島)	インタラクティブに振る舞う将 <u>週</u> : ソーシャルロボット構築のテ ソーシャルロボット制御のたと ロボットのボディーを物理的「 冬課題(未来のソーシャルロボ レス感染拡大防止のためのテ	とめの、マルチモーダル めのネットワークサービス こ出力する 3D プリンタ技 ジットの提案、試作に向け	処理を用いた会話を (担当:大村) :術(担当:大島) たプロジェクトワーク	ク)および評価オ	ペイントの解説(打
(オンデマンド)・・Googl (対面)・諸義室にて対 Week 1: Building interac Week 2-3: Real-time m Week 4: Network servic	stive sociable robots of the fi ultimodal processing for cons ses for sociable robot manipu ng technology, On-demand (I	載する。 uture, On-demand (Dr. O structing sociable robot's lation, On-demand (Dr. C	hshima) s conversation system		d (Dr. Ohshima)
	gnment(project work: propos ima)		iable robots of the	e future), evalu	ation and review
Week 6-7.5: Final assignates the face to face (Dr. Ohsher If there will be any clear spread of Corona virus If there is any changes of the face of the	ma) nanges regarding Toyohashi , the course content and eva about a class schedule, I will	ing and prototyping soc University of Technolo luation of achievement a inform you on Google C	gy Activity Restric re subject to chang	stions Level fo ge.	or Preventing th
Week 6-7.5: Final assignation for the set of	ma) nanges regarding Toyohashi , the course content and eva about a class schedule, I will ake the class whenever you ace to face class) <b>eview</b>	ing and prototyping soc University of Technolo, luation of achievement a inform you on Google C want.)	gy Activity Restric re subject to chang lassroom or KYOM	ctions Level fo ge. U JOHO SYST	or Preventing th EM.
Week 6-7.5: Final assig Face to face (Dr. Ohsh If there will be any cl Spread of Corona virus If there is any changes On-demand (You can t Face to face (Regular f Self Preparation and R 授業前までに指定され:	ma) nanges regarding Toyohashi , the course content and eva about a class schedule, I will ake the class whenever you ace to face class)	ing and prototyping soc University of Technolo, luation of achievement a inform you on Google C want.) 45 分)。授業後はその回	gy Activity Restric re subject to chang lassroom or KYOM の講義内容を復習	stions Level fo ge. U JOHO SYST すること(復習・	or Preventing th EM. 45分)。
Week 6-7.5: Final assig Face to face (Dr. Ohsh If there will be any cl Spread of Corona virus If there is any changes On-demand (You can t Face to face (Regular f Self Preparation and R 授業前までに指定され: Reviewing and preparin 45 minutes each.	ma) hanges regarding Toyohashi , the course content and eva about a class schedule, I will ake the class whenever you w ace to face class) aview た資料を熟読すること(予習く	ing and prototyping soc University of Technolo, luation of achievement a inform you on Google C want.) 45 分)。授業後はその回	gy Activity Restric re subject to chang lassroom or KYOM の講義内容を復習	stions Level fo ge. U JOHO SYST すること(復習・	or Preventing th EM. 45分)。
Week 6-7.5: Final assig Face to face (Dr. Ohsh If there will be any cl Spread of Corona virus If there is any changes On-demand (You can t Face to face (Regular f Self Preparation and R 授業前までに指定され: Reviewing and preparin 45 minutes each. Related subjects 特になし N/A Notes for textbook	ma) hanges regarding Toyohashi , the course content and eva about a class schedule, I will ake the class whenever you w ace to face class) aview た資料を熟読すること(予習く	ing and prototyping soc University of Technolo, luation of achievement a inform you on Google C want.) 45 分)。授業後はその回 ed materials are desirabl	gy Activity Restric re subject to chang lassroom or KYOM の講義内容を復習	stions Level fo ge. U JOHO SYST すること(復習・	or Preventing tl EM. 45分)。

Reference 1	Book title	Human-robot intera	action : an intro	duction	ISBN	978-
			T			1108735407
	Author	Christoph	Publisher	Cambridge	Publish	2020
		Bartneck [et		University	year	
Notes for afairs -		al.]		Press		
Notes for reference 特になし						
行になし N/A						
Goals to be achieve	d					
		なロボットの開発に必	要な基礎技術・	やその応用・課題等	について理解を	そそれである。
		作するインタラクティブ				
2) 機能と特徴、目的	に合致したロボッ	トデザインを提案でき	3			
3) ソーシャルロボッ	トの近年の動向や	•新規点を理解する				
Understanding follow	ving fundamental	and advanced issues	for building inte	ractive sociable ro	bots.	
1) Interactivity: Con	structing interact	ive robot acting appro	priately accord	ling to its purpose		
2) Design: proposing	new design to m	atch its ability, feature	es, and purpose	•		
	-	ids of interactive soci	al robots			
Evaluation of achiev						
レポート(50%)と課題	• = · · · · · · ·					
S: レポート・課題の						
A: レポート・課題の1						
B: レポート・課題の1 C: レポート・課題の1						
			the final repor	t (the total points (	are 100)	
S: the total points a	-	class assignments and	the final repor	t (the total points a	are 100).	
A: the total points a	-					
B: the total points a						
C: the total points a	0					
Examination						
試験期間中には何も	行わない					
None during exam p						
Details of examinati						
特になし						
N/A						
Other information						
特になし						
N/A						
Reference URL						
特になし						
N/A						
Office hours						
	00。ただし、事前に	こメール(ohshima@eiir	is.tut.ac.jp)でア	'ポイントをとること。	メールでの問し	い合わせはいつでも
良い。 Turaday 15:00 16:0	Mala	Subscription (C. 1997)				a shine to the
-		bintment beforehand b	by email. Stude	ents are welcome	to send an ema	il asking about the
course at any time.		f learning and education	20			
		i varning and ouddall				
	~~~~~					
(C)高度な知識を統 情報。知能工学なと			に依須し こねい	ナ= 国家 なート	しいなる的にチ	田本もて中球的。剑
		に関する高度な知識を	と修守し、てれた	って味趣胜次のため	リー統合的に沿。	用できる夫岐的・剧
造的能力を身につけ	してもの					
		ilize advanced knowled				
	-	omputer science and			fields; and have	the practical and
	lize suchknowledg	ge for problem solving	in an integrate	d manner		
Key words	<u></u>					
ロボット、デザインエ						
robot, design engine	ering, communica	tion				

# (M43630500)Data Science and Analysis 2[Data Science and Analysis 2]

Subject name[English]	Data Science and	Analysis 2[Data Sc	ience and Analysis	2]	
Schedule number	M43630500	Subject area	Advanced	Required or	Elective
			Computer	elective	
			Science and		
			Engineering		
Time of starting a course	Fall2 term	Day of the	Mon.2~2	Credit(s)	1
		week,period			
Faculty		n for Master's Degre	e	Subject grade	1~
Department Offered	Computer Scienc	e and Engineering		Beggining grade	M2
Charge teacher name[Roman	栗山 繁,青野 罗	推樹 KURIYAMA Shi	geru, AONO Masaki	8	
alphabet mark]					
Numbering	CMP_MAS52525				
Objectives of class					
本講義では、大規模または多次え	元のデータを効率的	かつ効果的に表示	する可視化の設計	手法を講述し、目的	に応じた視覚的
なデータ分析のワークフローを設	計する制作実習に。	よって、実践的な応り	用開発力を習得する	0	
This class teaches the design m	ethodology of deve	loping data explorat	ion tools by efficie	ntly and effectively	visualizing huge
size or dimension of dataset. Prac			-		
Contents of class					
(オンデマンド)第1週目:情報可礼	目化の道入と概要説	5 A B			
(オンデマンド)第2週目:相関の同					
(オンデマンド)第2週日:相関の。 (オンデマンド)第3週目:構造の同					
(オンデマンド)第3週日:桶垣の早 (オンデマンド)第4週目:相関の早					
(オンデマンド)第5週目:テキスト		「甜粿作			
(オンデマンド)第6週目:ワークフ					
(対面)第7+0.5 週目:制作課題発		**			
本学の新型コロナウィルス感染拡	大防止のための法	動基準の変更に伴	い、授業内容および	「成績の評価法に変	と更が生じる場合
があります。					
On-demand) Week 1. Introductio			tion		
On-demand) Week 2. Correlation					
On-demand) Week 3. Relation vis			sentation		
On-demand) Week 4. Visualizatio					
(On-demand) Week 5. Visualizatio		ation and time-varia	tion, and interactior	IS	
(On-demand) Week 6. Design of v					
(Face to face) Week 7+0.5: Prese					
If there will be any changes reg		-			r Preventing the
Spread of Corona virus, the cours	se content and eval	uation of achieveme	ent are subject to cl	nange.	
	まれて雨フニナフ	ナま会に動きナス			
予習 : Google Classroom 上に公開 復習 : Google Classroom 上に公開			_と。(40分)		
反白 ; Google Classroom エーン研 To enhance a learning effect, stud			k cupplied in Good	e Classroom for ar	ound 10 minutes
Students are encouraged to refer	0				Sund 40 minutes
Students are encouraged to refer	to answer samples	supplied in doogle		nu zo minutes.	
Related subjects					
数値解析 多変量解析 データマ	イニング特論				
		Data Mining			
Numerical analysis, Multivariate a		Data Mining			
Numerical analysis, Multivariate a <b>Notes for textbook</b>	nalysis, Advanced [		用する		
Numerical analysis, Multivariate a <b>Notes for textbook</b> e-ラーニングシステム(Google Cla	nalysis, Advanced [ assroom)に公開す	る電子テキストを使り			
Numerical analysis, Multivariate a No <b>tes for textbook</b> e-ラーニングシステム(Google Cla Digital textbook is supplied on an	nalysis, Advanced [ assroom)に公開す	る電子テキストを使り			
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference	nalysis, Advanced [ assroom)に公開す	る電子テキストを使り			
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし	nalysis, Advanced [ assroom)に公開す	る電子テキストを使り			
数値解析, 多変量解析, データマ Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A	nalysis, Advanced [ assroom)に公開す	る電子テキストを使り			
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A Goals to be achieved	nalysis, Advanced [ assroom)に公開す E-learning system	る電子テキストを使り of Google Classrool	n.		<u>、</u> 本 た 寸 担 川 - つ
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A Goals to be achieved 大規模、多次元のデータを効率的	nalysis, Advanced [ assroom)に公開す E-learning system	る電子テキストを使り of Google Classrool	n.	D性質を考慮して最	適な可視化ワー
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A Goals to be achieved 大規模、多次元のデータを効率的 クフローを設計できる技能を習得	nalysis, Advanced [ assroom)に公開す E-learning system のかつ効果的に可視 する	る電子テキストを使り of Google Classroor したするデザイン手;	n. まを理解し、データ0		
Numerical analysis, Multivariate an Notes for textbook e-ラーニングシステム(Google Cla Digital textbook is supplied on an Notes for reference 特になし N/A Goals to be achieved	nalysis, Advanced [ assroom)に公開す E-learning system りかつ効果的に可視 する n design methodolo	る電子テキストを使り of Google Classroor れてするデザイン手 gy for efficiently ar	n. まを理解し、データの d effectively visuali	zing huge size of r	nulti-dimensiona

# レポート課題の合計 100 点で採点する。 S:達成目標をすべて達成しており、かつレポート課題の合計点(100 点満点)が 90 点以上 A:達成目標を90%達成しており、かつレポート課題の合計点(100 点満点)が80 点以上 B:達成目標を 75%達成しており, かつレポート課題の合計点(100 点満点)が 70 点以上 C:達成目標を 60%達成しており、かつレポート課題の合計点(100 点満点)が 60 点以上 The score is calculated by the Report(Exercise) of the total of 100 points S: 90 or more, A: 80 or more, B: 70 or more, C: 60 or more Examination レポートで実施 By Report **Details of examination** 特になし N⁄A Other information 特になし N⁄A Reference URL 特になし N⁄A **Office hours** 随時だが、電子メールで予約をとること。 Anytime, but requires reservation by E-mail. Relations to attainment objectives of learning and education 情報·知能工学専攻 (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけて いる。 Graduate Program of Computer Science and Engineering for Master's Degree (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner Key words 情報検索、情報可視化、ビジュアル情報処理 Information visualization, Visual data analytics, Visual information processing

## (M43630520)3D Vision Computation 1[3D Vision Computation 1]

3D Vision Computation 1[3D	Vision Computation 1	]		
M43630520	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Fall1 term	Day of the week,period	Tue.2~2	Credit(s)	1
Graduate Program for Master	r's Degree		Subject grade	1~
Computer Science and Engin	eering		Beggining grade	M1
. 金澤 靖 KANAZAWA Yasush	i		<u>.</u>	
CMP_MAS52525				
	M43630520 Fall1 term Graduate Program for Master Computer Science and Engin 金澤 靖 KANAZAWA Yasush	M43630520     Subject area       Fall1 term     Day of the week,period       Graduate Program for Master's Degree     Computer Science and Engineering       金澤 靖 KANAZAWA Yasushi	Fall1 term     Day of the week,period     Tue.2~2       Graduate Program for Master's Degree     Computer Science and Engineering       Computer Science and Engineering     Computer Science and Engineering	M43630520     Subject area     Advanced Computer Science and Engineering     Required or elective       Fall1 term     Day of the week,period     Tue.2~2     Credit(s)       Graduate Program for Master's Degree     Subject grade     Subject grade       Computer Science and Engineering     Beggining grade       金澤 靖 KANAZAWA Yasushi     Subject

#### Objectives of class

This course involves fundamentals and advanced issues on 3D reconstruction from images.

This course involves fundamentals and advanced issues on 3D reconstruction from images.

## **Contents of class**

All lectures will be done by "remote simultaneous interactive" and "on-demand".

 ${\sf Each}\ "{\sf on-demand}\ "{\sf lecture}\ {\sf material}\ {\sf will}\ {\sf be}\ {\sf available}\ {\sf after}\ {\sf the}\ {\sf corresponding}\ {\sf on-line}\ {\sf lecture}.$ 

- 1. Introduction and Projective Geometry
- 2. Epipolar Geometry
- 3. 3D reconstruction from Two Views
- 4. Affine Projection
- 5. Uncalibrated Stereo
- 6. Structure from Motion
- 7. Robust Estimation in Computer Vision
- 8. Experiment and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM. All lectures will be done by "remote simultaneous interactive" and "on-demand".

 ${\sf Each}\ "{\sf on-demand}\ "{\sf lecture}\ {\sf material}\ {\sf will}\ {\sf be}\ {\sf available}\ {\sf after}\ {\sf the}\ {\sf corresponding}\ {\sf on-line}\ {\sf lecture}.$ 

- 1. Introduction and Projective Geometry
- 2. Epipolar Geometry
- 3. 3D reconstruction from Two Views
- 4. Affine Projection
- 5. Uncalibrated Stereo
- 6. Structure from Motion
- 7. Robust Estimation in Computer Vision
- 8. Experiment and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

## Self Preparation and Review

Since the handouts are available via web page beforehand, please read the handouts and the corresponding part on reference books.

Since the handouts are available via web page beforehand, please read the handouts and the corresponding part on reference books. **Related subjects** 3D Vision Computation II Geometry, Linear Algebra, Statistics. Notes for textbook Handouts will be prepared. Handouts will be prepared. Book title ISBN 978-Reference 1 Guide to 3D vision computation : geometric analysis 3319484921 and implementation Author Kenichi Kanatani, Publish 2016 Publisher Springer Yasuyuki Sugaya, International year Yasushi Publishing AG Kanazawa 978-Reference2 Book title ISBN Multiple view geometry in computer vision 0521540513 Author Richard Hartley, Publisher Cambridge Publish 2003 Andrew University Press year **Zisserman** Notes for reference N/A N/A Goals to be achieved The goals of this course are to (1) Understand and explain the basic knowledge of projective geometry. (2) Understand and explain the epipolar geometry. (3) Understand and explain the basic theory of 3-D reconstruction from images. (4) Understand and explain the basic knowledge of robust estimation. (5) Understand and explain the basic method of image matching. The goals of this course are to (1) Understand and explain the basic knowledge of projective geometry. (2) Understand and explain the epipolar geometry. (3) Understand and explain the basic theory of 3-D reconstruction from images. (4) Understand and explain the basic knowledge of robust estimation. (5) Understand and explain the basic method of image matching. **Evaluation of achievement** Grade will be determined by all submitted reports: S: score  $\geq = 90$ A: score >= 80 B: score >= 70 C: score >= 60 Grade will be determined by all submitted reports: S: score >= 90 A: score >= 80 B: score >= 70 C: score >= 60 Examination レポートで実施 By Report Details of examination Other information Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa) Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa) **Reference URL** http://www.img.cs.tut.ac.jp/ http://www.img.cs.tut.ac.jp/

**Office hours** Anytime. Please make an appointment beforehand by E-mail. Anytime. Please make an appointment beforehand by E-mail.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

# Key words

3D reconstruction, computer vision

3D reconstruction, computer vision

# (M43630530)3D Vision Computation 2[3D Vision Computation 2]

Subject name[English]	3D Vision Co	mputation 2[3D Visio	n Computation 2]	1	T	1
Schedule number	M43630530		Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Fall2 term		Day of the week,period	Tue.2~2	Credit(s)	1
Faculty	Graduate Pro	gram for Master's De			Subject grade	1~
Department Offered	Computer Sc	ience and Engineering	ŝ		Beggining grade	M1
Charge teacher	菅谷 保之 S	UGAYA Yasuyuki			grado	
name[Roman alphabet						
mark]						
Numbering	CMP_MAS52	525				
and discuss the perform <b>Contents of class</b> 1. カメラの射影、カメラ材 2. AR アプリケーション 3. 矩形マーカーを用いた 4. 実験と議論1 5. 自然特徴点を用いた 5. 自然特徴を用いた 7. 実験と議論3 1. Introduction and came 2. AR applications 3. Camera pose estimati 4. Experiment and discu 5. Camera pose estimati 6. Camera pose estimati 6. Camera pose estimati 7. Experiment and discu 8. Experiment and discu	な正の基礎 ニカメラの位置推 メラの位置推定 era projection a ion by a rectan sion ion by 2-D text ion by lines ssion	定 Ind Fundamental of ca gular marker and Carr	amera calibration		<er< th=""><th></th></er<>	
Self Preparation and Re The handouts are availa The handouts are availa Related subjects Geometry, Linear Algebr Notes for textbook Handouts will be prepare	ble via web pag ble via web pag ra, Statistics. ra, Statistics. ed.					
Handouts will be prepare <b>Reference1</b>	ed. Book title	Multiple View Geom	netry.		ISBN	
			- T	O much 11		2000
	Author	R.I. Hartley and A. Zisserman	Publisher	Cambridge University Press	Publish year	2000
Reference2	Book title	Computer Vision	A Modern Appro	ach	ISBN	
	Author	D.A. Forsyth and J. Ponce	Publisher	Prentice Hall	Publish year	2003
Reference3	Book title	Guide to 3D Vision	Computation	1	ISBN	
	Author	K. Kanatani, Y. Sugaya, and Y. Kanazawa	Publisher	Springer	Publish year	2016

otes for reference
行なし
/Α
oals to be achieved
nderstanding of the fundamentals and advanced issues on image processing and computer vision including:
camera projection
camera calibration from various features
AR applications
nderstanding of the fundamentals and advanced issues on image processing and computer vision including:
camera projection
camera calibration from various features
AR applications
valuation of achievement
rade will be determined by all submitted reports:
score >= 90
: score ≻= 80
: score ≻= 70
: score ≻= 60
rade will be determined by all submitted reports:
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: score ≻= 80
: score ≻= 70
: score >= 60
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oom C−507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)
oon o oo, Ext. oroo, Email. Sugaya emilios.tut.dojp (rasuyuki bugaya/
oom C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)
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lease send an appointment e-mail in advance.
eek dav
lease send an appointment e-mail in advance.
elations to attainment objectives of learning and education
) Practical and creative skills to utilize advanced knowledge in an integrated manner
ave advanced knowledge about computer science and engineering as well as related fields; and have the practical and
reative skills to utilize such knowledge for problem solving in an integrated manner
C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as
lated fields; and to utilize such knowledge in an integrated manner
ey words ンピュータビジョン、カメラ校正、AR アプリケーション
omputer vision, camera calibration, AR application

# (M43630550)Advanced System and Knowledge Sciences[Advanced System and Knowledge Sciences]

Subject name[English]		n and Knowledge Sc	1	ystem and Knowled	ge Sciences
Schedule number	M43630550	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Fall1 term	Day of the week,period	Tue.5~5	Credit(s)	1
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	1~
Department Offered	Computer Science	ce and Engineering		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	石田 好輝 ISHID	DA Yoshiteru			
Numbering	CMP_MAS53125				
<b>Objectives of class</b> Focusing on: Matching Automator This course provides opportunitie * Modeling and analysis on compl * System theoretic analysis on c * Computer simulations and impli * Implementation of complex system Recent topics on complex system	is to learn the follo ex systems and lea omplex systems an cations, and sems and learning s	wings: arning systems, Id learning systems , systems.		e.	
Contents of class (Face to Face) 1st week: Introduc (Face to Face) 2nd week: Matchin (on-demand) 3rd week: Classifica (on-demand) 4th week: Visualizat (on-demand) 5th week: Discrete I (on-demand) 6th week: Discrete I (Face to Face) 7th week: Design Self Preparation and Review	ng Automaton tion of Stable Marri ion of Stable Marri Modeling of Visual Modeling of Auditor	riage Problem (chap. age Problem (chap. Recognition (chap. 5 ry Recognition (chap	4) )		
Related subjects					
Notes for textbook No textbook. References other th Roth, A.E., Sotomayor, M.A.O.: University Press, (1992); Gale, D., Shapley, L.S.: College ad Gusfield, D., Irving, R.W.: The stab Ishida, Y.: Immunity–Based Syster Ishida, Y : Self–Repair Networks, Barabasi, A.L.: Linked, Perseus, (2 Strogatz, S. H. Sync, Hyperion (2 Notes for reference	Two-sided matchir missions and the s le marriage probler ns, Springer (2004 Springer (2015); 2002);	ng: A study in game tability of marriage m: structure and algo	e-theoretic modelin American mathemat	ical monthly, 9-15	
Goals to be achieved					
<b>Evaluation of achievement</b> Class performance (50%) and term	n-end report (50%)				
Course Evaluation	ormance(presentat	ions) and reports (10	00 points).		

その他
Other
Details of examination
Other information
Room F-504, Ext. 6895
Reference URL
Office hours
Tuesday 16:30-17:00
Relations to attainment objectives of learning and education
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically

Key words

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

## (M43630560)Human Sensation and Perception 1[Human Sensation and Perception 1]

Subject name[English]	Human Sensation and Perception 1[Human Sensation and Perception 1]					
Schedule number	M43630560	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective	
Time of starting a course	Fall1 term	Day of the week,period	Tue.4~4	Credit(s)	1	
Faculty	Graduate Program for Ma	aster's Degree		Subject grade	1~	
Department Offered	Computer Science and E	ngineering		Beggining grade	M1	
Charge teacher name[Roman alphabet mark]	中内 茂樹 NAKAUCHI S	higeki		<u>.</u>		
Numbering	CMP_MAS53025					

### **Objectives of class**

This course is designed to introduce you to the scientific study of human nature. You will learn why and how scientists ask question about the sensation and perception and the relation of brain and behavior. You will also learn about the research methods to measure the perception and cognition used in the field of psychology and cognitive science. Finally, you will be able to create your own experiments using the 'OpenSesame', worldwide well-known software for creating experiments for psychology, cognitive science, neuroscience and experimental economics.

This course is designed to introduce you to the scientific study of human nature. You will learn why and how scientists ask question about the sensation and perception and the relation of brain and behavior.You will also learn about the research methods to measure the perception and cognition used in the field of psychology and cognitive science.Finally, you will be able to create your own experiments using the 'OpenSesame', worldwide well-known software for creating experiments for psychology, cognitive science, neuroscience and experimental economics.

#### **Contents of class**

- 1. [face-to-face or remote] Introduction to "Science of Human Sensation and Perception"
- 2. [on-demand] Video (MIT open courseware) and short quiz (assignment)
- 3. [face-to-face or remote] Measuring Perception research methodology -
- 4. [on-demand] Short quiz and Online experiment (assignment)
- 5. [face-to-face or remote] Workshop for creating experiments using "OpenSesame"
- 6. [on-demand] Perform experiment and analyze your own data (assignment)
- 7. [on-demand] Perform experiment and analyze your own data (assignment)
- 8. [face-to-face or remote] Wrap up the course

Note: If there is any changes about a class schedule, it will be informed on Google Classroom or KYOMU JOHO SYSTEM.

- 1. [face-to-face or remote] Introduction to "Science of Human Sensation and Perception"
- 2. [on-demand] Video (MIT open courseware) and short quiz (assignment)
- 3. [face-to-face or remote] Measuring Perception research methodology -
- 4. [on-demand] Short quiz and Online experiment (assignment)
- 5. [face-to-face or remote] Workshop for creating experiments using "OpenSesame"
- 6. [on-demand] Perform experiment and analyze your own data (assignment)
- 7. [on-demand] Perform experiment and analyze your own data (assignment)
- 8. [face-to-face or remote] Wrap up the course

Note: If there is any changes about a class schedule, it will be informed on Google Classroom or KYOMU JOHO SYSTEM.

# Self Preparation and Review

Read the documents provided before each lecture. Review the lectures in consultation with the references and other resources such as the Internet. In order to increase the learning effect, it is desirable to prepare and review the class content (about 90 minutes for each) by referring to the relevant sections of the textbook.

Read the documents provided before each lecture. Review the lectures in consultation with the references and other resources such as the Internet. In order to increase the learning effect, it is desirable to prepare and review the class content (about 90 minutes for each) by referring to the relevant sections of the textbook.

#### **Related subjects**

Human Sensation and Perception II

Human Sensation and Perception II

### Notes for textbook

Documents (pdfs of the textbook and slides) will be provided via google classroom before commencement of the lectures. Documents (pdfs of the textbook and slides) will be provided via google classroom before commencement of the lectures.

Reference1	Book title	Cognitive Ne edition	eurosc	ience; Fourth I	nternational Student	ISBN	978- 0393922288
	Author	Michael Gazzaniga	S.	Publisher	W. W. Norton & Company	Publish vear	2008
Notes for reference		dallaniga			Company	,	
N/A							
N/A							
Goals to be achieved							
To be able to explain t	he differences	between tradit	ional ir	nformation proc	essing and human info	ormation prod	essing
To be able to discuss r				-	-	-	-
To be able to discuss I		-	0		· ·		6
To be able to explain t	he differences	between tradit	ional ir	nformation proc	essing and human info	ormation prod	cessing
To be able to discuss r							
To be able to discuss I	human-machine	e symbiosis					
Evaluation of achieven	nent						
Grades will be based o	n theme report	s from each le	cture (	(60%) and the fi	nal report (40%)		
S: total points, 90 or hi							
A: total points, 80 or h							
B: total points, 70 or h	-						
C: total points, 60 or h	-						
Grades will be based o			cture (	(60%) and the fi	nal report (40%)		
S: total points, 90 or hi	igher (out of 10	0 points).					
A: total points, 80 or h	igher (out of 10	0 points).					
B: total points, 70 or h	igher (out of 10	00 points).					
C: total points, 60 or h							
Examination							
レポートで実施							
By Report							
Details of examination							
N/A							
N/A							
Other information							
Please contact Prof. N	lakauchi (F2-70	)2−2, nakauchi	tut.jp	) if you have ar	y questions.		
Please contact Prof. N	lakauchi (F2-70	)2−2, nakauchi®	tut.jp	) if you have ar	y questions.		
Reference URL							
Will be announced duri	ng the lecture.						
Will be announced duri	ng the lecture.						
Office hours							
Anytime, but contact t	o Prof.Nakauch	ni by e−mail bef	oreha	nd.			
Anytime, but contact t	o Prof.Nakauch	ni by e−mail bef	oreha	nd.			
Relations to attainmen		loanning and o					
(C1) 情報・知能工学お	ふよびその関連	分野の理論・応	用知	識を自発的に獲	[得し, それらを統合的	に活用できる	る能力を身につけて
いる。							
(C1) 情報・知能工学お	ふよびその関連	分野の理論・応	用知	識を自発的に獲	[得し, それらを統合的	に活用できる	る能力を身につけて
いる。							
(C1) To acquire theor	etical and appli	ied knowledge	of info	ormation and ir	telligence engineering	and related	fields on their own
initiative, and to acquir	e the ability to	utilize such kr	owled	ge in an integra	ted manner.		
(C1) Have the skills to	voluntarilv ac	quire theories	and a	plied knowled	e about computer sci	ence and en	gineering as well as
related fields; and to ut	-	-					
Key words			0				
cognitive neuroscience	es, perception.	vision					

# (M43630570)Human Sensation and Perception 2[Human Sensation and Perception 2]

Subject name[English]	Human Sens	ation and Perception	n 2[Human Sensa	ation and Perception	2]	
Schedule number	M43630570		Subject area	Advanced	Required or	Elective
				Computer	elective	
				Science and		
				Engineering		
Time of starting a course	Fall2 term		Day of the week,period	Tue.4~4	Credit(s)	1
Faculty	Graduate Pro	ogram for Master's [	Degree		Subject grade	1~
Department Offered	Computer So	cience and Engineer	ing		Beggining grade	M1
Charge teacher	鯉田 孝和 K	OIDA Kowa			_	
name[Roman alphabet						
mark]						
Numbering	CMP_MAS53	025				
Objectives of class	_					
After the course, stude	nte will be abl	e to understand the	e structure and t	function of the sens	ony systems ar	nd how sensation
and perception work tog						
			avior. Students w	in able to utilize psy		thous to measure
the perception, and data Contents of class		y us wen.				
	al machanic-	a for consistion	d percention +	a visual cortax	d beyond (1-+	quarter) colours
Courses on physiologic						
perception, objects/sce	ne, depth and s	size, motion, attentio	on, and project w	ork on Illusion Hack	< (zna quarter)	
Course moderator: Prof.	-					
Course instructors: Prof	f. Shigeki Naka	uchi, Assoc.prof. Ko	wa Koida			
Self Preparation and Re	view					
Delete di sublicite						
Related Sudjects						
Related subjects						
-						
Notes for textbook						
Notes for textbook						
-	Book title	カンデル神経科学			ISBN	4895927717
Notes for textbook	Book title Author	Eric R. Kandel	Ź Publisher	メディカル・サイ	ISBN Publish year	4895927717 2014
Notes for textbook		Eric R. Kandel [ほか]編 ;		エンス・インター		
Notes for textbook		Eric R. Kandel [ほか]編 ; Sarah Mack ア				
Notes for textbook		Eric R. Kandel [ほか]編 ;		エンス・インター		
Notes for textbook		Eric R. Kandel [ほか]編 ; Sarah Mack ア		エンス・インター		
Notes for textbook		Eric R. Kandel [ほか]編 ; Sarah Mack ア		エンス・インター		
Notes for textbook Reference1 Notes for reference	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター	Publisher	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター	Publisher	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	Publisher	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	Publisher	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievement	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements / p Examination	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements / p Examination 授業を実施	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements / p Examination 授業を実施 Regular Class	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements (written assignments / p Examination 授業を実施 Regular Class Details of examination	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements / p Examination 授業を実施 Regular Class	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p Examination 授業を実施 Regular Class Details of examination Other information	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achievements (written assignments / p Examination 授業を実施 Regular Class Details of examination	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
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Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p Examination 授業を実施 Regular Class Details of examination Other information	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p Examination 授業を実施 Regular Class Details of examination Other information Reference URL	Author	Eric R. Kandel [ほか] 編 ; Sarah Mack ア ート・エディター Science <sup>"</sup> , 5th Edition	<b>Publisher</b>	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p Examination 授業を実施 Regular Class Details of examination Other information Reference URL Office hours	Author oles of Neural S k, active partic ont project work) S	Eric R. Kandel [ほか] 編 : Sarah Mack ア ート・エディター Science <sup>7</sup> , 5th Edition ipation. Scale 0-5 (0 = fail, 5	Publisher n = excellent)	エンス・インター		
Notes for textbook Reference1 Notes for reference カンデル神経科学 E. Kandel et al., "Princip Goals to be achieved Course and project work Evaluation of achieveme (written assignments / p Examination 授業を実施 Regular Class Details of examination Other information Reference URL	Author oles of Neural S k, active partic ont project work) S	Eric R. Kandel [ほか] 編 : Sarah Mack ア ート・エディター Science <sup>7</sup> , 5th Edition ipation. Scale 0-5 (0 = fail, 5	Publisher n = excellent)	エンス・インター		

情報・知能工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。

Graduate Program of Computer Science and Engineering for Master's Degree (A) Personality and outlook with a broad perspective Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare **Key words** 

#### (M43630580)X Reality and Psychology 1[X Reality and Psychology 1]

Subject name[English]	X Reality and Psychology 1[X Reality and Psychology 1]								
Schedule number	M43630580	Subje	oct are	a	Advanced		Required	or	Elective
				Computer		elective			
					Science	and			
					Engineering				
Time of starting a course	Fall1 term	Day	of	the	Thu.2~2		Credit(s)		1
		week	,perioc	I					
Faculty	Graduate Program	n for Ma	aster's	Degre	e		Subject gra	de	1~
Department Offered	Computer Science	e and E	nginee	ring			Beggining		M1
		grade							
Charge teacher name[Roman	北崎 充晃 KITAZ	北﨑 充晃 KITAZAKI Michiteru							
alphabet mark]									
Numbering	CMP_MAS53225								

#### Objectives of class

After the course, students will understand the principles of X reality (cross reality: XR) including virtual reality (VR), mixed reality (MR), and augmented reality (AR) on psychological, physiological, and functional levels. They will also be able to understand the benefits and challenges of VR/MR/AR/XR on the future society.

After the course, students will understand the principles of X reality (cross reality: XR) including virtual reality (VR), mixed reality (MR), and augmented reality (AR) on psychological, physiological, and functional levels. They will also be able to understand the benefits and challenges of VR/MR/AR/XR on the future society.

#### **Contents of class**

講義も学生のプレゼンも全て英語で行われます(All lectures including presentations are conducted in English)。

X Reality including Virtual Reality, Mixed Reality, and Augmented Reality will be explained about its mechanisms and functions not only in the engineering perspective but also psychological perspective. The final part of the class is composed of students' presentations of their original application, device or idea on X Reality and the discussion on it.

(on-demand) 1. Introduction to XR and Psychology

(on-demand) 2. Two components of reality

(on-demand) 3. Visual reality, Mixed Reality and Augmented reality

(on-demand) 4. Multi- and Cross-modality phenomenon

(on-demand) 5. Embodied cognition and Augmented human

(online interactive) 6. Exploring cyberspace

(online interactive) 7. Presentations by students and Discussion

(online interactive) 8. Presentations by students and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for

Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

X Reality including Virtual Reality, Mixed Reality, and Augmented Reality will be explained about its mechanisms and functions not only in the engineering perspective but also psychological perspective. The final part of the class is composed of students' presentations of their original application, device or idea on X Reality and the discussion on it.

(on-demand) 1. Introduction to XR and Psychology

(on-demand) 2. Two components of reality

(on-demand) 3. Visual reality, Mixed Reality and Augmented reality

(on-demand) 4. Multi- and Cross-modality phenomenon

(on-demand) 5. Embodied cognition and Augmented human

(online interactive) 6. Exploring cyberspace

(online interactive) 7. Presentations by students and Discussion

(online interactive) 8. Presentations by students and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change. If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

#### Self Preparation and Review

Read the documents provided before each lecture (90min).

Review the lectures in consultation with the references provided and other resources such as scientific articles and research
youtube video (90min).
Read the documents provided before each lecture (90min).
Review the lectures in consultation with the references provided and other resources such as scientific articles and research
youtube video (90min).
Related subjects
X Reality and Psychology 2 Human Sensation and Percention 1 and 2
Human Sensation and Perception 1 and 2
X Reality and Psychology 2 Human Sensation and Perception 1 and 2
Notes for textbook
NA
NA
Notes for reference
Read the documents provided before each lecture. Review the lectures in consultation with references and other resources
such as scientific articles and youtube research video.
Read the documents provided before each lecture. Review the lectures in consultation with references and other resources
such as scientific articles and youtube research video.
Goals to be achieved
To understand fundamentals on perception and cognition as basics for virtual reality (VR)
To understand principles of virtual reality (VR), mixed reality (MR), and augmented reality (AR)
To understand current findings on VR/MR/AR research
To consider the benefits and challenges of VR/MR/AR on the future society
To understand fundamentals on perception and cognition as basics for virtual reality (VR)
To understand principles of virtual reality (VR), mixed reality (MR), and augmented reality (AR)
To understand current findings on VR/MR/AR research
To consider the benefits and challenges of VR/MR/AR on the future society
Evaluation of achievement
Grades will be based on performance in each lecture (40%) and the final report (60%)
S: 90 points or higher (out of 100)
A: 80 points or higher (out of 100)
B: 70 points or higher (out of 100)
C: 60 points or higher (out of 100)
Grades will be based on performance in each lecture (40%) and the final report (60%)
S: 90 points or higher (out of 100)
A: 80 points or higher (out of 100)
B: 70 points or higher (out of 100)
C: 60 points or higher (out of 100)
Examination
レポートで実施
By Report
Details of examination
NA
NA Other information
NA
NA
Reference URL
NA
NA
Office hours
One hour after lecture. Please contact by e-mail mich@tut.jp
One hour after lecture. Please contact by e-mail mich@tut.jp
Relations to attainment objectives of learning and education
Key words
virtual reality, augmented reality, cognition
virtual reality, augmented reality, cognition

# (M43630590)X Reality and Psychology 2[X Reality and Psychology 2]

Subject name[English]	X Reality and Psy	chology	2[X F	Reality	and Psychology 2]		
Schedule number	M43630590	Subjec	t area	a	Advanced	Required or	Elective
		-			Computer	elective	
					Science and		
					Engineering		
Time of starting a course	Fall2 term	Day week,p	of	the	Thu.2~2	Credit(s)	1
Faculty	Graduate Program					Subject grade	1~
Department Offered	Computer Scienc			-		Beggining	М1
-	-		_			grade	
Charge teacher name[Roman	松井 淑恵,南 都	哲人 MAT	rsui -	Toshie	, MINAMI Tetsuto		
alphabet mark]							
Numbering	CMP_MAS53025						
Objectives of class							
仮想現実(virtual reality, VR)、褚	ē合現実(mixed real	ity, MR)	、拡引	長現実	(augmented reality	, AR)、およびクロス	スリアリティ(cross
reality, XR)の原理を、心理的、	生理学的、およひ	機能レ	ベルマ	で理解	『できるようになり	ます。また、将来	の社会における
VR/MR/AR/XR の利点と課題に	ついての理解を深め	うます。					
After the course, students will u	nderstand the princ	iples of v	virtual	realit	y (VR), mixed realit	ty (MR), augmented	I reality (AR), and
X reality (cross reality: XR), on	psychological, phys	siological	, and	funct	ional levels. They	will also be able to	o understand the
benefits and challenges of $\ensuremath{VR}\xspace/\ensuremath{M}\xspace$	R/AR/XR on the fu	ture soc	iety.				
Contents of class							
X reality and Psychology I(第一	クォーター)で学んた	ミ、視覚詞	忍知、	聴覚詞	忍知、触覚およびそ	の他のモダリティの	認知、クロスモー
ダル認知、VR、MR、および AR に	ついて、関連する諸	話題につ	いての	)講義	と演習を行います。		
第1週 導入(対面) 担当: 南							
第2週計測手法一般(オンデマ)	ノド) 担当: 南						
第3週 脳波(オンデマンド) 担当							
第4週眼球運動(オンデマンド)							
第5週空間聴覚(オンデマンド)							
第6週バイノーラル聴覚と音の		ノド) 担当	当:松井	#			
第7週視覚と聴覚のインタラクシ				•			
本学の新型コロナウィルス感染拡	大防止のためのほ	動其進	の変す	同に伴	い.授業内容およ7	「成績の評価法にす	変更が生じる場合
があります。		动至十	~~~	cien			
授業実施形態が変更になる場合	It GoogleClassroo	m またけ	⊦ 教	「「「」。	マテム上り通知しま	ŧŧ	
Lectures and project works rela	-						uditory cognition
tactile and other modality cogniti		-	-			visual obgrittion, a	duitory obgrittion,
		Britelon, 1	, , , , , , , , , , , , , , , , , , , ,	rt, arra	/		
West 1 Teter dusting (from to from	) has Done Minami						
Week 1. Introduction (face to fac							C 141
Week 2. Methods of X reality and		emand: y	ou ca	п таке	the class wheneve	er you want) by Pro	t. Minami
Week 3. EEG (On-demand) by Pr							
Week 4. Eye-tracking (On-demar	-	Mataul					
Week 5. Spatial hearing (On-dem			A		Mataul		
Week 6. Binaural hearing and sou Week 7. Interaction between the	-	-				Antoui	
week 7. Interaction between the	visual and additory	System	Un-u	emano	a) by Assoc. prof. I	viatsui	
If there will be any changes re			-				or Preventing the
Spread of Corona virus, the cour					-	-	
If there is any changes about a c	lass schedule, we w	ull inform	i you i	on Go	ogle Classroom or I	KYOMU JOHO SYS	SIEM.
Self Preparation and Review							
予習:講義の指定範囲を事前に			ノドマ	(00 *			
復習:配布資料を整理し、関連情							
Preparation: Preliminary research	0					(00 )	
Review: Organize handouts and s	earch for relevant i	ntormatio	on to	broad	en your knowledge.	(90 minutes)	
Related subjects							
X Reality and Psychology I							
Human perception and sensation							
X Reality and Psychology I							

Human perception and sensation Notes for textbook 授業中にハンドアウトを配布します。 Handouts will be distributed in the class. Notes for reference 特になし N/A Goals to be achieved 仮想現実(Virtual Reality)、複合現実(Mixed Reality)、拡張現実(Augmented Reality)、およびクロスリアリティ(Crossed reality) の原理を、心理的、生理学的、および機能レベルにおける理解。また、将来の社会における VR/MR/AR/XR の利点と課題につ いての理解 To understand the principles of virtual reality (VR), mixed reality (MR), augmented reality (AR), and X reality (cross reality: XR), on psychological, physiological, and functional levels. And to understand the benefits and challenges of VR/MR/AR/XR on the future society. **Evaluation of achievement** 評価基準:原則的にすべての講義に出席したものにつき、下記のように成績を評価する。 S:レポートの合計点(100 点満点)が 90 点以上 A:レポートの合計点(100 点満点)が 80 点以上 B:レポートの合計点(100 点満点)が 70 点以上 C:レポートの合計点(100 点満点)が 60 点以上 Students who attend all the classes will be evaluated as follows: S: Obtained total points of weekly assignments, 90 or higher (out of 100 points). A: Obtained total points of weekly assignments, 80 or higher (out of 100 points). B: Obtained total points of weekly assignments, 70 or higher (out of 100 points). C: Obtained total points of weekly assignments, 60 or higher (out of 100 points). Examination 試験期間中には何も行わない None during exam period **Details of examination** 特になし N/A Other information 特になし N/A **Reference URL** 特になし N/A Office hours 必要に応じて随時対応します。メールなどで事前に連絡を取ってください。 On a necessary basis. Please contact me by e-mail in advance. Relations to attainment objectives of learning and education (C)高度な知識を統合的に活用できる実践力・創造力 情報・知能工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践的・創 造的能力を身につけている。 (C1) 情報・知能工学およびその関連分野の理論・応用知識を自発的に獲得し, それらを統合的に活用できる能力を身につけて いる。 (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize suchknowledge for problem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner Key words

# (M44610050)Seminar on Applied Chemistry and Life Science 1[Seminar on Applied Chemistry and Life Science 1]

Subject name[English]	Seminar on App Science 1]	lied Chemistry and I	₋ife Science 1[Sem	ninar on Applied Cl	nemistry and Li
Schedule number	_		Advanced Applied Chemistry and Life Science	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	3
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	1~
Department Offered	Applied Chemist	ry and Life Science		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員	4kei kyomu Iin−S		8.000	l
Numbering	CHE_MAS55015				
Objectives of class					
This course will provide the stud science by reading textbooks and knowledge and presentation skills applied chemistry and life science <b>Contents of class</b> The students will be required to are suggested by his/her supervi	d scientific papers s required for his/ e. read textbooks an	under the guidance 'her research in the d papers written by d	of his/her supervis seminar as well as other language thar	or. The aim of the to deepen his/her Japanese, especia	lesson is to lea understanding illy English, whic
Self Preparation and Review	sor, and to report	and discuss deeply o		subject in the semi	nar.
Preparation (20 minutes or more)	and review (25 mi	inutes or more) are a	enerally required fo	r each class	
Your advisor will give you more d		-		. 54011 01455.	
Related subjects					
Seminar on Applied Chemistry an	d Life Science 2				
Thesis Research on Applied Cher		ience			
All other relevant subjects in App	-				
Notes for textbook					
Supervisor will recommend textbe	ooks, papers, and r	research materials to	students.		
Notes for reference					
N/A					
Goals to be achieved					
To acquire basic knowledge on ap			d abomiatur and life		
To understand the contents of so To be able to make oral and post				science	
Evaluation of achievement	er presentations re	elevant to papers ne/	SHE HAS LEAU		
The evaluation is based on the	scores of reading	textbooks and scien	tific papers discus	sions, reports and	presentations
his/her research in the seminar.					P. 000110113
S: 90 or higher (out of 100 points					
A: 80 or higher (out of 100 points					
B: 70 or higher (out of 100 points					
C: 60 or higher (out of 100 points	;)				
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A Other information					
N/A					
Reference URL					
http://chem.tut.ac.jp/en/					
Office hours					
Students are encouraged visiting	by appointment				
Students are encouraged visiting Relations to attainment objective		education			
Students are encouraged visiting Relations to attainment objective		education			

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

### Key words

# (M44610060)Seminar on Applied Chemistry and Life Science 2[Seminar on Applied Chemistry and Life Science 2]

Subject name[English]	Seminar on App Science 2]	lied Chemistry and I	_ife Science 2[Sem	inar on Applied Cl	nemistry and Li
Schedule number	M44610060	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	3
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~
Department Offered	Applied Chemist	ry and Life Science		Beggining grade	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員4	4kei kyomu Iin−S		Brane	
Numbering	CHE_MAS65015				
Objectives of class					
Based on the Seminar on Applie opportunity to study on his/her re the guidance of his/her supervise research in the seminar. <b>Contents of class</b> The students will be required to re	esearch subject ir or. The students	n applied chemistry a will learn the know	and life science by ledge and the pres	reading textbooks sentation skills req	and papers und uired for his/h
are suggested by his/her supervise					
Self Preparation and Review	-				
Preparation (20 minutes or more)	and review (25 mi	inutes or more) are g	enerally required fo	r each class.	
Your advisor will give you more de	tailed instructions	s on preparation and	review as needed.		
Related subjects					
Seminar on Applied Chemistry and					
Thesis Research on Applied Chem					
All other relevant subjects in appli	ed chemistry and	lite science			
Notes for textbook	-l		-444.		
Supervisor will recommend textbo Notes for reference	окs, papers, and r	esearcn materials to	students.		
N/A					
Goals to be achieved					
To acquire basic knowledge on ap	olied chemistry ar	nd life science			
To understand the contents of sci	-		d chemistry and life	science	
To be able to make oral and poste					
Evaluation of achievement		·			
The evaluation is based on the s	cores of reading	textbooks and scier	ntific papers, discus	sions, reports and	presentations
his/her research in the seminar. H					
S: 90 or higher (out of 100 points),					
A: 80 or higher (out of 100 points)					
B: 70 or higher (out of 100 points)	,				
C: 60 or higher (out of 100 points)					
Examination					
試験期間中には何も行わない					
None during exam period  Details of examination					
N/A					
Other information					
N/A					
Reference URL					
<b>Reference URL</b> http://chem.tut.ac.jp/en/					
http://chem.tut.ac.jp/en/	by appointment.				
http://chem.tut.ac.jp/en/ Office hours		education			

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

### Key words

(M44610070)Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]

Subject name[English]	Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applie							
	Chemistry and Lif							
Schedule number	M44610070	Subject area Advanced Applied Chemistry and Life Science				Required or elective	Required	
Time of starting a course	2Years	Day week.	of	the	Intensive	Credit(s)	6	
Faculty	Graduate Program				e	Subject grade	1~1	
Department Offered	Applied Chemistry	Applied Chemistry and Life Science					M1, M2	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 4	·系各教	〕員 4k	ei kyor	mu Iin−S, 4kei kakul	kyouin		
Numbering	CHE_MAS68015							

## **Objectives of class**

In the course, the students will perform advanced researches on applied chemistry 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 Applied Chemistry and Life Science 1

Seminar on Applied Chemistry and Life Science 2

### 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 applied chemistry and life science

To master experimental techniques and analytical skills required for research on a given field of applied chemistry and life science

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).

S: 90 or higher (out of 100 points),

A: 80 or higher (out of 100 points),

B: 70 or higher (out of 100 points),

C: 60 or higher (out of 100 points) Examination

試験期間中には何も行わない

None during exam period

# **Details of examination**

Other information

# Supervisor

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

Key words

(M44610070)Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]

Subject name[English]	Thesis Research	on Applied	Chem	nistry and Life Sc	ience[Thesis	Rese	earch on Appli
	Chemistry and Li			-			
Schedule number	M44610070	Subject area		Advanced Applied Chemistry and Life Science	Required or elective		Required
Time of starting a course	2Years	Day of week,perio	the d	Intensive	Credit(s)		6
Faculty	Graduate Program	n for Master'	s Degre	ee	Subject gra	nde	1~1
Department Offered	Applied Chemistr	y and Life Sc	ience		Beggining		M1, M2
Charge teacher name[Roman	S4系教務委員, 4	4系各教員 4	kei kyo	mu Iin−S, 4kei kakul	<b>grade</b> kyouin		
alphabet mark] Numbering	CHE MAS68015						
Objectives of class							
In the course, the students will his/her supervisor in the labora skills required for his/her resear related studies by others, and to discussing in the final review of h	tory. The aims of ch subject, to learn o write a master's th	this lessen a the scientifi hesis. The st	are to a ic and	acquire the knowled social importance o	dge and expe f his/her sub	erimen oject k	tal and analytic by researching f
Contents of class		6313.					
The students are required to have	ave his/her researd	ch subject u	nder th	e direction of his/	her supervise	or and	perform his/h
research by acquiring the expe scientific and social background research. The results from his/ results from his/her research, di Self Preparation and Review	d of his/her resear her research must	rch subject l be describe	by coll d as a	ecting and reading master's thesis. T	the referend he students	ces re must	elating to his/h also present t
The supervisor will give instruction	ons on preparation :	and review as	neces	sarv			
Related subjects							
Seminar on Applied Chemistry ar	nd Life Science 1						
Seminar on Applied Chemistry ar	nd Life Science 2						
Notes for textbook							
Supervisor will recommend textb	ooks, papers, and re	esearch mate	rials to	students.			
Notes for reference							
N/A							
Goals to be achieved							
To acquire basic knowledge on a							
To master experimental techniq	ues and analytical	skills require	d for r	esearch on a giver	n field of app	olied o	hemistry and l
science							
To be able to present and discus			arch				
To be able to make safety contro	oi in experimental w	orK					
Evaluation of achievement	d an bia /b - · · · · · · ·	la Alaasta ay J	مام ح	and the second	aal waxdaaa f	hin /l	لد -لا مقومهم بر
The score of the course is based (the quality of his/her research,							
S: 90 or higher (out of 100 points			nu ans	wering the question	s on his/her	prese	ntation etc).
A: 80 or higher (out of 100 points							
B: 70 or higher (out of 100 points							
C: 60 or higher (out of 100 points							
Examination							
None during exam period							
Details of examination							
N/A							
Other information							
N/A							
N/A							

Students are encouraged visiting by appointment.

### Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

## Key words

(M4461007T)Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]

Subject name[English]	Thesis Researc	ch on Applied Chen	nistry and Life Sc	ience[Thesis Rese	arch on Applie
	Chemistry and I				
Schedule number	M4461007T	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Progra	am for Master's Degr	ee	Subject grade	2~2
Department Offered	Applied Chemis	try and Life Science		Beggining grade	M2
Charge teacher name[Roman	S4系教務委員	4系各教員 4kei kyo	mu Iin−S, 4kei kakuł	-	I
alphabet mark] Numbering	CHE MAS68015				
Objectives of class					
In the course, the students will his/her supervisor in the laborat skills required for his/her resear related studies by others, and to discussing in the final review of h	tory. The aims o ch subject, to lea write a master's	f this lessen are to m the scientific and thesis. The students	acquire the knowled social importance o	dge and experimen f his/her subject b	tal and analytic y researching f
Contents of class	lis/fier waster s	nesis.			
The students are required to ha	ave his/her resea	rch subject under th	e direction of his/	her supervisor and	perform his/h
research by acquiring the expe		•		•	•
scientific and social background					
research. The results from his/					-
results from his/her research, dis	scuss, and answer	the questions with t	ne reviewers in the <sup>.</sup>	final master's disse	rtation defense
Self Preparation and Review					
The supervisor will give instruction	ons on preparatior	and review as neces	sary.		
Related subjects					
Seminar on Applied Chemistry ar					
Seminar on Applied Chemistry ar	nd Life Science 2				
Notes for textbook					
Supervisor will recommend textb	ooks, papers, and	research materials to	students.		
Notes for reference					
N/A Goals to be achieved					
To acquire basic knowledge on a	nnliad chamistry a	nd life science			
To master experimental techniq			research on a giver	field of applied of	hemistry and li
science	ass and analytica		Social off a giver		
To be able to present and discus	s on the results o	f his/her research			
To be able to make safety control					
Evaluation of achievement					
The score of the course is based	d on his/her maste	er's thesis and the pr	esentation in the fir	al review of his/he	er master's thes
(the quality of his/her research, I					
S: 90 or higher (out of 100 points	s),				
A 00 111 / 1 5100 11	s).				
A: 80 or higher (out of 100 points					
B: 70 or higher (out of 100 points					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b>					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b>					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b>					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A					
B: 70 or higher (out of 100 points C: 60 or higher (out of 100 points <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b>					

Students are encouraged visiting by appointment.

### Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

## Key words

# (M44610080)Seminar on Applied Chemistry and Life Science[Seminar on Applied Chemistry and Life Science]

Subject name[English]	Seminar on App Science]	lied Chemistry and	Life Science[Semi	nar on Applied Ch	emistry and Li
Schedule number	M44610080	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Required
Time of starting a course	Year	Day of the week,period	Intensive	Credit(s)	6
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	2~2
Department Offered	Applied Chemist	ry and Life Science		Beggining grade	M2
Charge teacher name[Roman	S4系教務委員	4kei kyomu Iin−S		8.000	
alphabet mark]					
Numbering	CHE_MAS68015				
Objectives of class					
This course will provide the stud	lents with the opp	ortunity to study on	his/her research s	subject in applied o	chemistry and li
science by reading textbooks and	d papers under the	e guidance of his/her	supervisor. The st	udents will learn th	ne knowledge ar
the presentation skills required for	or his/her research	in the seminar.			
Contents of class					
The students will be expected	to read textbook	s and papers writte	n by foreign langu	age that are indi	cated by his/h
supervisor, and report and discus	s deeply on his/he	er research subject ir	the seminar.		
Self Preparation and Review					
The supervisor will give instruction	ons on preparation	and review as neces	sary.		
Your advisor will give you more d			-		
Related subjects		·			
Thesis Research on Applied Cher	nistry and Life Sci	ence			
All other relevant subjects in App	-				
Notes for textbook					
Supervisor will recommend textbo	ooks and naners to	students			
Notes for reference					
N/A					
Goals to be achieved					
To acquire basic knowledge on a	nlied chemistry or	d life colonoa			
To understand the contents of so			d chemistry and life	science	
To be able to make oral and post				30101100	
To be able to make oral and post	er presentations re	sievant to papers ne/	SHE HAS LEAU		
Evaluation of achievement					
	opprop_of_w!!	nonoro diagonation	roporte and	ntations of his /	
The evaluation is based on the		papers, discussions,	reports and prese	nuations of his/he	r research in th
seminar. His/her supervisor evalu					
S: 90 or higher (out of 100 points					
A: 80 or higher (out of 100 points					
B: 70 or higher (out of 100 points					
C: 60 or higher (out of 100 points	;)				
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
N/A					
Reference URL					
http://chem.tut.ac.jp/en/					
Office hours					
Students are encouraged visiting	by appointment.				
		education			
Relations to attainment objective					
Relations to attainment objective	· · · · · · · · · · · · · · · · · ·				
Relations to attainment objective					
Relations to attainment objective					

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media

(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

# Key words

# (M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	-	er Chemistry[Advan			T
Schedule number	M44630070	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Elective
Time of starting a course	Fall1 term	Day of the week,period	Tue.2~2	Credit(s)	1
Faculty	Graduate Progra	m for Master's Degr	ee	Subject grade	1~
Department Offered	Applied Chemist	ry and Life Science		Beggining grade	M1
Charge teacher name[Roman	原口 直樹 HAR	AGUCHI Naoki			L
alphabet mark]					
Numbering	CHE_MAS52225				
Objectives of class This course focuses on the synt chemistry will be discussed. Contents of class	hetic aspects of po	blymer-supported ch	emistry. Several apį	olications of solid-s	supported organi
(face to face) Week 1 Preparatio Preparation method of polymer-s Preparation of functional polyme Preparation of functional polyme (on-demand) Week 2 Nucleoph Electrophhilic reactions on the fu Polymer-supported reagents (face to face) Week 3 Polymer-s Asymmetric reaction using polym Solid phase peptide synthesis (face to face) Week 4 Principles (on-demand) Week 5 Anionic F (face to face) Week 6 Polymer M (on-demand) Week 7 Report Solf Preparation and Review To enhance a learning effect, stu To prepare for and review the lear Related subjects	support rs by polymer react rs by polymerizatio ilic reactions on th unctional polymers upported catalysts ner-supported cata for living polymeriz Polymerization licrosphere	tion method n method e functional polymer lyst ation ged to examine the o			
Organic chemistry					
Polymer chemistry					
Notes for textbook					
No textbook will be used. Notes for reference					
Goals to be achieved	institut of the d				
<ol> <li>To understand radical polymer</li> <li>To understand reactions of po</li> </ol>					
3)To understand the synthesis of	•	olymers			
4)To understand the structure f		-			
Evaluation of achievement					
S: 90 or higher (out of 100 points	3)				
A: 80 or higher (out of 100 points	5)				
B: 70 or higher (out of 100 points					
C: 60 or higher (out of 100 points	s)				
Examination					
レポートで実施					
By Report					
Details of examination N∕A					

Other information B-404 6812 haraguchi@chem.tut.ac.jp

#### **Reference URL**

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

Office hours

Any time

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

(C)高度な知識を統合的に活用できる実践力・創造力

応用化学・生命工学およびその関連分野に関する高度な知識を修得し,それらを課題解決のために統合的に活用できる実践 的・創造的能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilizesuch knowledge for problem solving in an integrated manner

Key words

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

# (M44630080)Advanced Polymer Engineering[Advanced Polymer Engineering]

Subject name[English]	Advanced Polyme	er Engineering	[Advar	nced Polymer Engin	eering]				
Schedule number	M44630080	Subject are	a	Advanced	Required or	Elective			
				Applied	elective				
				Chemistry and					
				Life Science					
Time of starting a course	Fall2 term	Day of	the	Tue.2~2	Credit(s)	1			
		week,perio							
Faculty	Graduate Program			e	Subject grade	1~			
Department Offered	Applied Chemistry	y and Life Sc	ience		Beggining	M1			
					grade				
Charge teacher name[Roman	吉田 絵里 YOSH	IIDA Eri							
alphabet mark]	CHE MAS52225								
Numbering									
Objectives of class									
1. To acquire knowledge of a		syntheses in	cluding	g well-controlled p	olymerizations an	d heterogeneous			
polymerizations in supercritical ca 2. To understand molecular self-a		d in vitue							
Contents of class	issembly in vivo and	u in vitro.							
Contents of class									
(face-to-face) Week 1 Controlle	d radical polymeriza	ation 1							
(face-to-face) Week 2 Controlle									
(face-to-face) Week 3 Macromo			polym	erization					
(face-to-face) Week 4 Heteroge									
(on-demand) Week 5 Polymeriza			lioxide						
(on-demand) Week 6 Supramole	cular chemistry								
(on-demand) Week 7 Theory of	molecular self-asse	embly							
(on-demand) Week 8 Nanotechr	ology based on mol	lecular self-a	ssemb	ly					
Due to changes in the standards for activities to prevent the spread of COVID-19 infection at the Toyohashi University of									
Technology, there may be change									
be notified from Google Classroor		-							
Self Preparation and Review				-					
Go over the lecture materials and	l your notebook to e	enhance your	under	standing.					
Related subjects									
N⁄A									
Notes for textbook									
No textbook is needed.									
Notes for reference									
N∕A									
Goals to be achieved									
To understand the cutting-edge t	echnology and indu	strial applicat	ions o	f well-controlled po	lymers.				
Evaluation of achievement									
Report assignment									
Examination									
レポートで実施									
By Report									
Details of examination									
N⁄A									
Other information									
N/A									
Reference URL									
N/A									
Office hours									
Available at anytime	<u>.</u>								
Relations to attainment objective	s of learning and ea	ducation							

(A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 (B)技術者・研究者としての正しい倫理観と社会性 上級技術者・研究者として社会的・倫理的責任を有し、社会における技術的課題を設定・解決・評価する能力を身につけてい る。 (C)高度な知識を統合的に活用できる実践力・創造力 応用化学・生命工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践 的・創造的能力を身につけている。 >>(C1) 応用化学・生命工学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身に つけている。 >>(C2) 応用化学・生命工学およびその関連分野の広範囲の知識の連携により,研究開発に対する方法論を体得して,研究開 発の計画を立案および実践し、課題解決のための新たな技術を創造できる能力を身につけている。 (E)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計画し学習する能力を身につけている。 Graduate Program of Applied Chemistry and Life Science for Master's Degree (A) Personality and outlook with a broad perspective Have a mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as public welfare (B) Sound ethics and social awareness as advanced-level engineers and researchers Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; and have the ability to set, solve and evaluatetechnical issues in society (C) Practical and creative skills to utilize advanced knowledge in an integrated manner Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilizesuch knowledge for problem solving in an integrated manner (C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner (C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and developmentand put them into practice; and to create new technologies to solve problems

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changesin society, environment and technology

Key words

応用化学·生命工学専攻

Controlled/living radical polymerization, Molecular self-assembly, Supramolecular chemistry

## (M44630300)Applied Environmental Biology[Applied Environmental Biology]

		ronmental Biology[A <sub>l</sub>	pplied Environme	ntal Biology]		
name[English] Schedule number	M44630300		Subject area	Advanced Applied Chemistry and	Required or elective	Elective
Time of starting a	Fall1 term		Day of the	Life Science	Credit(s)	1
course			week,period			
Faculty	Graduate Pr	ogram for Master's D	Degree		Subject	1~
Department Offered	Applied Cher	mistry and Life Scier	nce		grade Beggining	M1
Charge teacher name[Roman alphabet nark]	中鉢 淳 NA	KABACHI Atsushi			grade	
Numbering	CHE_MAS53	225				
2nd week:Prokaryotic g 3rd week:Eukaryotic ge 4th week:Plant-microb 5th week:Agricultural p 6th week:Integrated pe 7th week:Genetically m	enomes e interactions pests and disea est managemen					
All classes will be held Any changes of class so f there are any change	chedules will be s regarding "Te	e announced on Goo oyohashi University o	gle Classroom or of Technology Ac	KYOMU JOHO SYS	evel for	anged.
All classes will be held Any changes of class so f there are any change Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are require	chedules will bu s regarding ″To of Corona Viru <b>eview</b> n is required, at	e announced on Goo oyohashi University o s <sup>"</sup> , the course conte	gle Classroom or of Technology Ac onts and achieven	KYOMU JOHO SYS	evel for	
All classes will be held Any changes of class so f there are any change Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are require	chedules will bu s regarding "To of Corona Viru eview n is required, at red.	e announced on Goo oyohashi University o s <sup>°</sup> , the course conte fter class review of h Molecular Biology	gle Classroom or of Technology Ac ents and achieven nandouts is recon	KYOMU JOHO SYS stivity Restrictions L nent evaluation meth nmended.	evel for	978- 0815344643
All classes will be held Any changes of class so f there are any change Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are require	chedules will bu s regarding "To of Corona Viru <b>eview</b> n is required, at red.	e announced on Goo oyohashi University o s <sup>″</sup> , the course conte fter class review of h	gle Classroom or of Technology Ac ents and achieven	KYOMU JOHO SYS	evel for hods can be cha	978-
All classes will be held i Any changes of class so if there are any change Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are requir Reference1	chedules will bu s regarding "To of Corona Viru eview n is required, at red.	e announced on Goo oyohashi University o s <sup>°</sup> , the course conte fter class review of h Molecular Biology Bruce Alberts et	gle Classroom or of Technology Ac ents and achieven nandouts is recon of the Cell <b>Publisher</b>	KYOMU JOHO SYS stivity Restrictions L nent evaluation method nmended.	evel for hods can be cha	978- 0815344643 2014 978
Bth week : Summary All classes will be held i Any changes of class so if there are any change Preventing the Spread Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are require Reference1 Reference2	eview n is required, at red. Author	e announced on Goo oyohashi University o s <sup>°</sup> , the course conte fter class review of h Molecular Biology Bruce Alberts et al. Plant Physiology a Lincoln Taiz,	gle Classroom or of Technology Ac ents and achieven nandouts is recon of the Cell <b>Publisher</b>	KYOMU JOHO SYS stivity Restrictions L nent evaluation method nmended.	evel for hods can be cha ISBN Publish year	978- 0815344643
All classes will be held i Any changes of class so f there are any change Preventing the Spread Self Preparation and Re Although no preparation Related subjects N/A Notes for textbook No textbooks are requir Reference1	eview n is required, at red. Book title Author Book title	e announced on Goo oyohashi University o s <sup>°</sup> , the course conte fter class review of h Molecular Biology Bruce Alberts et al. Plant Physiology a	gle Classroom or of Technology Ac ents and achieven nandouts is recon of the Cell <b>Publisher</b> and Development	KYOMU JOHO SYS stivity Restrictions L nent evaluation method nmended. Garland Science	evel for hods can be cha ISBN Publish year ISBN	978- 0815344643 2014 978 1605352558

(1) Understand the concept of evolution and biodiversity.

(2) Can explain how genomes are analyzed.

(3) Can tell the difference between prokaryotic and eukaryotic genomes.

(4) Know various biological interactions.

(5) Know important agricultural pests and diseases.

(6) Understand the concept of integrated pest management.

(7) Understand the technology for developing genetically modified crops.

#### Evaluation of achievement

Achievements are evaluated by essays/term papers.

S: Achieved all goals and obtained 90-100 points (out of 100) in essays/term papers.

A: Achieved 80% of goals and obtained 80-89 points (out of 100) in essays/term papers.

B: Achieved 70% of goals and obtained 70-79 points (out of 100) in essays/term papers.

C: Achieved 60% of goals and obtained 60-69 points (out of 100) in essays/term papers.

Examination

レポートで実施

By Report

Details of examination

N/A Othe N/A

Other information

**Reference URL** 

N/A

Office hours

Emails are welcome.

Relations to attainment objectives of learning and education

応用化学・生命工学専攻 (A)幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。 (B)技術者・研究者としての正しい倫理観と社会性 上級技術者・研究者として社会的・倫理的責任を有し、社会における技術的課題を設定・解決・評価する能力を身につけてい る。 (C)高度な知識を統合的に活用できる実践力・創造力 応用化学・生命工学およびその関連分野に関する高度な知識を修得し、それらを課題解決のために統合的に活用できる実践 的・創造的能力を身につけている。 (D)グローバルに活躍できるコミュニケーション力 グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で、自らの考えや成果を効果的に表現するコミュニ

ケーションカを身につけている。

Graduate Program of Applied Chemistry and Life Science for Master's Degree

(A) Personality and outlook with a broad perspective

Have a mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as public welfare

(B) Sound ethics and social awareness as advanced-level engineers and researchers

Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; and have the ability to set, solve and evaluatetechnical issues in society

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilizesuch knowledge for problem solving in an integrated manner

(D) Communication skills for global success

Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members

Key words

The instructor has a working experience at RIKEN and University of Arizona, USA.

#### (M44630430)Advanced Molecular Design Chemistry 1[Advanced Molecular Design Chemistry 1]

Schedule number	Advanced Molecu	ılar Design Chemistr	y 1[Advanced Mole	cular Design Chem	istry 1]
	M44630430	Subject area	Advanced	Required or	Elective
			Applied	elective	
			Chemistry and		
			Life Science		
Time of starting a course	Fall term	Day of the	Intensive	Credit(s)	2
· · · · · · · · · · · · · · · · · · ·		week,period			
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~
Department Offered	Applied Chemistr	y and Life Science		Beggining	M1
•				grade	
Charge teacher name[Roman	S4系教務委員 4	kei kyomu Iin−S		-	I
alphabet mark]		-			
Numbering	CHE MAS52225				
Objectives of class	_				
This course will provide the stud	lents with the oppor	tunity to study on t	he calented subject	in the realm of ad	wanaad malaaul
design chemistry.	dents with the oppor	tunity to study on t			vanceu molecui
Contents of class					
	/ı ·				
The classes will be given by his	-		equirea to read text	books and papers	but the type a
contents of this course depend of	on his/her supervise	or.			
Self Preparation and Review					
90 minutes of preparation and 90	0 minutes of review	are generally require	ed for each class of	90 minutes.	
Related subjects					
Advanced Molecular Design Che	mistry 2				
Notes for textbook					
Supervisor will recommend textb	books and papers to	students.			
Notes for reference					
N/A					
Goals to be achieved					
To acquire advanced knowledge	on advanced moleci	Ilar design chemistr	,		
To be able to report and discuss					
Evaluation of achievement					
The evaluation is based on the s	soores of reports pr	ecentations and exa	mination		
		esentations, and exa	inination.		
His/her supervisor evaluates the					
S: 90 or higher (out of 100 points					
A: 80 or higher (out of 100 points					
B: 70 or higher (out of 100 points					
C: 60 or higher (out of 100 point	s)				
Examination					
試験期間中には何も行わない					
None during exam period					
Details of examination					
N/A					
Other information					
Other information N/A					
N/A Reference URL					
N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/					
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours	y by appointment				
N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting		ducation			
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours		ducation			
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting	es of learning and e		grated manner		
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv	es of learning and e	knowledge in an inte	-	fields; and have t	the practical a
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv (C) Practical and creative skills t	es of learning and e to utilize advanced k ut applied chemistr	knowledge in an inte y and life science	as well as related	fields; and have t	he practical a
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv (C) Practical and creative skills t Have advanced knowledge abou creative skills to utilize such knowledge sourcestive skil	to utilize advanced k ut applied chemistr owledge for problem	knowledge in an integ y and life science solving in an integra	as well as related ted manner		
N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv (C) Practical and creative skills t Have advanced knowledge about	to utilize advanced k ut applied chemistr owledge for problem ily acquire theories	knowledge in an inter y and life science solving in an integra and applied knowlec	as well as related ted manner		

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive

knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

Applied chemistry, Life science, Materials science and engineering

#### (M44630450)Advanced Molecular Functional Chemistry 1[Advanced Molecular Functional Chemistry 1]

		ular Functional Chem	istry ILAdvanced N	Iolecular Functiona	I Chemistry 1
Schedule number	M44630450	Subject area	Advanced	Required or	Elective
			Applied	elective	
			Chemistry and		
			Life Science		
Time of starting a course	Fall term	Day of the	Intensive	Credit(s)	2
-		week,period			
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~
Department Offered	Applied Chemistr	y and Life Science		Beggining	M1
				grade	
Charge teacher name[Roman	S4系教務委員 4	kei kyomu Iin−S			
alphabet mark]					
Numbering	CHE_MAS52225				
Objectives of class					
This course will provide the stud	dents with the oppor	tunity to study on t	he selected subject	in the realm of ad	vanced molecul
functional chemistry.			-		
Contents of class					
The classes will be given by his	/her supervisor. Th	e students will be re	equired to read text	books and papers	but the type a
contents of this course depend					-,,, , , , ,
Self Preparation and Review					
90 minutes of preparation and 90	0 minutes of review	are generally require	d for each class of	90 minutes.	
Related subjects		6 xii y i e qui e			
Advanced Molecular Functional	Chemistry 2				
Notes for textbook					
Supervisor will recommend texts	ooks and namers to	students			
Notes for reference		students.			
N/A					
Goals to be achieved					
To acquire advanced knowledge	an advanced meleo	ular functional cham	otro (		
To acquire auvanceu knowledge					
To be able to report and discuss					
To be able to report and discuss					
To be able to report and discuss Evaluation of achievement	the contents of te	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s	s the contents of tex	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the	s the contents of tex scores of reports, pr e scores.	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point	s the contents of tex scores of reports, pr e scores. s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point	s the contents of tex scores of reports, pr e scores. s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b>	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b>	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b>	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
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To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b>	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/	s the contents of tex scores of reports, pr e scores. s), s), s),	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b>	s the contents of tex scores of reports, pr e scores. s), s), s), s)	ktbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting	s the contents of tex scores of reports, pr e scores. s), s), s), s) s)	xtbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b>	s the contents of tex scores of reports, pr e scores. s), s), s), s) s)	xtbooks and papers I	ne∕she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting <b>Relations to attainment objectiv</b>	s the contents of tex scores of reports, pr e scores. s), s), s), s) g by appointment. res of learning and e	esentations, and exa	ne/she has read.		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting <b>Relations to attainment objectiv</b> (C) Practical and creative skills	s the contents of tex scores of reports, pr e scores. s), s), s), s) <u>g by appointment.</u> <b>res of learning and e</b> to utilize advanced k	esentations, and exa esentations, and exa ducation	re/she has read.	fields: and have a	the practical a
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting <b>Relations to attainment objectiv</b> (C) Practical and creative skills	s the contents of tex scores of reports, pr e scores. s), s), s), s) <u>g by appointment.</u> <b>res of learning and e</b> to utilize advanced h ut applied chemistr	Atbooks and papers I esentations, and exa ducation ducation	re/she has read. mination. grated manner as well as related	fields; and have t	the practical a
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting <b>Relations to attainment objectiv</b> (C) Practical and creative skills Have advanced knowledge abour creative skills to utilize such knowledge abour Content of the state of the skills of the sk	s the contents of tex scores of reports, pr e scores. s), s), s), s) <u>g by appointment.</u> <b>res of learning and e</b> to utilize advanced h ut applied chemistr pwledge for problem	Atbooks and papers I esentations, and exa ducation ducation	grated manner as well as related ted manner		
To be able to report and discuss <b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point <b>Examination</b> 試験期間中には何も行わない None during exam period <b>Details of examination</b> N/A <b>Other information</b> N/A <b>Reference URL</b> http://chem.tut.ac.jp/en/ <b>Office hours</b> Students are encouraged visiting <b>Relations to attainment objectiv</b> (C) Practical and creative skills	s the contents of tex scores of reports, pr e scores. s), s), s), s) <u>g by appointment.</u> <b>res of learning and e</b> to utilize advanced k ut applied chemistr pwledge for problem ily acquire theories	Atbooks and papers I esentations, and exa ducation ducation and life science solving in an integra and applied knowled	grated manner as well as related ted manner		

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive

knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

Applied chemistry, Life science, Materials science and engineering

#### (M44630470)Advanced Molecular Biological Chemistry 1[Advanced Molecular Biological Chemistry 1]

<b>•</b> • • •		ular Biological Chemi	stry 1[Advanced M	olecular Biological (	Chemistry 1]
Schedule number	M44630470	Subject area	Advanced Applied Chemistry and	Required or elective	Elective
			Life Science		
Time of starting a course	Fall term	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Progra	m for Master's Degre	e	Subject grade	1~
Department Offered	Applied Chemistr	y and Life Science		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員4	lkei kyomu Iin−S			
Numbering	CHE_MAS52225				
Objectives of class	_				
This course will provide the stud	lents with the oppo	tunity to study on t	he selected subject	in the realm of ad	vanced molecu
biological chemistry.					
Contents of class					
The classes will be given by his	/her supervisor Th	e students will be re	auired to read text	hooks and naners	but the type a
contents of this course depend	-			soons and papers	sat the type a
Self Preparation and Review	on ms/ ner supervisi	л.			
	• • · · · • • • • • • • · · · ·			00	
90 minutes of preparation and 90	o minutes of review	are generally require	ou for each class of	ou minules.	
Related subjects					
Advanced Molecular Biological C	nemistry 2				
Notes for textbook					
Supervisor will recommend texts	books and papers to	students.			
Notes for reference					
N/A					
Goals to be achieved					
To acquire advanced knowledge		-			
To be able to report and discuss	the contents of te				
		REDUCKS and papers i	ie/ she has read.		
Evaluation of achievement					
<b>Evaluation of achievement</b> The evaluation is based on the s	cores of reports, pr				
<b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the	cores of reports, pr scores.				
<b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 points	cores of reports, pr scores. s),				
<b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point	scores of reports, pr e scores. s), s),				
<b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point	scores of reports, pr e scores. s), s), s),				
<b>Evaluation of achievement</b> The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL	scores of reports, pr e scores. s), s), s),				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/	cores of reports, pr e scores. s), s), s), s)				
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/	cores of reports, pr e scores. s), s), s), s) g by appointment.	esentations, and exa			
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv	g by appointment.	esentations, and exa	mination.		
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv	g by appointment. res of learning and e	esentations, and exa	mination.	fields: and have t	he practical a
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objective (C) Practical and creative skills the Have advanced knowledge about creative skills to utilize such knowledge about Context of the state of the s	g by appointment. res of learning and e to utilize advanced l ut applied chemistr	esentations, and exa	grated manner as well as related ted manner		
Evaluation of achievement The evaluation is based on the s His/her supervisor evaluates the S: 90 or higher (out of 100 point A: 80 or higher (out of 100 point B: 70 or higher (out of 100 point C: 60 or higher (out of 100 point Examination 試験期間中には何も行わない None during exam period Details of examination N/A Other information N/A Reference URL http://chem.tut.ac.jp/en/ Office hours Students are encouraged visiting Relations to attainment objectiv (C) Practical and creative skills the Have advanced knowledge about	g by appointment. res of learning and e to utilize advanced l ut applied chemistr wiledge for problem ily acquire theories	esentations, and exa ducation ducation and life science solving in an integra and applied knowled	grated manner as well as related ted manner		

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive

knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

Applied chemistry, Life science, Materials science and engineering

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

A 11	a				
Subject name[English]	_	rchitecture and Civ	I Engineering ISe	eminar on Archite	ecture and Civil
	Engineering I]				
Schedule number	M45610010	Subject area	Advanced	Required or	Required
			Architecture	elective	
			and Civil		
			Engineering		
Time of starting a course	Year	Day of the	Intensive	Credit(s)	3
	1 our	week,period			Ū
Faculty	Graduata Progr	am for Master's Degre		Subject grade	1~
Department Offered		d Civil Engineering	56	Beggining	
Department Offered	Architecture and	a Civil Engineering			M1
	0= 5 批 改 千 日			grade	
Charge teacher name[Roman	S5糸教務安貝	5kei kyomu Iin-S			
alphabet mark]					
Numbering	ARC_MAS51015				
Objectives of class					
All the students are required to	attend all the ser	minars, which is arrar	nged by the laborate	orv supervisor for	the special study
subjects related to the current re					
supervisor at the guidance of the	-	the laboratory. The			
Contents of class	seminar.				
Contents of class					
Self Preparation and Review					
Delete di suble ste					
Related subjects					
Notes for textbook					
Notes Common					
Notes for reference					
Goals to be achieved					
<b>F</b> 1 11 <b>6</b> 11 1					
Evaluation of achievement					
Report					
Examination					
その他					
Other					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and	education			
Key words					

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

Outlinet mentel[Englink]				·····	
Subject name[English]	-	rchitecture and Civ	II Engineering IILS	eminar on Archit	ecture and Givil
<u> </u>	Engineering II	<b></b>		<b>_</b>	
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 Progra	am for Master's Degre	ee	Subject grade	2~
Department Offered	_	d Civil Engineering		Beggining	M2
Dopardinente errereu				grade	
Charge teacher name[Roman	05	5kei kyomu Iin-S		grado	
	35 示 软 伤 女 貝	Jker kyönnu im-3			
alphabet mark]					
Numbering	ARC_MAS61015	)			
Objectives of class					
All the students are required to	attend all the se	minars, which is arrar	nged by the laborate	ory supervisor for	the special study
subjects related to the current re	esearch activity o	f the laboratory. The	scheduled program	of the seminars is	announced by the
supervisor at the guidance of the		,			,
Contents of class	oonnindi.				
Self Preparation and Review					
Related subjects					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Report					
Examination					
その他					
Other					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and	education			
Key werde					
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	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	1~1
Department Offered	Architecture and	d Civil Engineering		Beggining grade	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員	5kei kyomu Iin-S			
Numbering	ARC_MAS61015				
Objectives of class					
This thesis research on architect	ure and civil engir	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 o	of the thesis vary	depending on the la	boratory. All studen	ts must present tl	neir thesis at the
end of the course and take a fin				aduation of the ma	aster course. The
study for the thesis is planned an	id conducted unde	er the guidance of the	e 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 pi	reparation and presei	ntation of the thesis	•	
<b>Examination</b> その他					
その他 Other					
Details of examination					
Other information					
Refer to administration office.					
Reference URL					
Refer to the URL of each laborat	ory				
Office hours					
Refer to administration office.					
Relations to attainment objective	es of learning and a	education			
Key words					

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

Subject name[English]		n on Architecture and	_		
	Civil Engineering	-		nesis nesearen on	
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	am for Master's Degre	e	Subject grade	1~1
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	kyouin	
Numbering	ARC MAS61015				
Objectives of class	/				
This thesis research on architect	ture and civil engi	neering is designated	to deepen the know	wledge and enhance	e the skills of the
students in their research fields t					
Contents of class					
The subjects and the contents of	of the thesis varv	depending on the la	boratory. All studen	its must present tl	neir thesis at the
end of the course and take a fir					
study for the thesis is planned ar	nd conducted unde	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	reparation and prese	ntation of the thesis	S	
その他					
Other Details of examination					
Decails of examination					
<b>Other information</b> Refer to administration office.					
Reference URL					
Refer to the URL of each laborat	orv				
Office hours	-				
Refer to administration office.					
Relations to attainment objective	es of learning and	education			
Key words					

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

Subject name[English]	Thesis Researc	h on Architecture and	I Civil Engineering[T	hesis Research on	Architecture and
	Civil Engineering	g]			
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
<b></b>		week,period			
Faculty	_	am for Master's Degre	e	Subject grade	2~2
Department Offered	Architecture an	d Civil Engineering		Beggining grade	M2
Charge teacher name[Roman	S5系教務委員	5kei kyomu Iin-S		-	
alphabet mark]					
Numbering	ARC_MAS61015	5			
Objectives of class					
This thesis research on architect	ture and civil engi	neering is designated	to deepen the know	vledge and enhanc	e the skills of the
students in their research fields t					
Contents of class	0				
The subjects and the contents of	of the thesis varv	depending on the la	boratorv. All studer	ts must present t	heir thesis at the
end of the course and take a fir	-		-	-	
study for the thesis is planned ar					
Self Preparation and Review		0			
Related subjects					
Notes for textbook					
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					
試験期間中には何も行わない					
None during exam period					
Details of examination					
Other information					
Refer to administration office.					
Reference URL					
Refer to the URL of each laborat	on				
Office hours	.ory				
Refer to administration office.					
Relations to attainment objective	as of learning and	education			
Key words					

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

Subject name[English]	-	rchitecture and C	ivil Engineering[Ser	nınar on Archite	cture and Civil
	Engineering		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	m for Master's Degr	ee	Subject grade	2~2
Department Offered	_	d Civil Engineering		Beggining	M2
				grade	
Charge teacher name[Roman	S5系教務委員:	5kai kuomu Iin-S		grado	
_	30 宋 秋 彻 女 貝、	Jker kyönnu In-3			
alphabet mark]					
Numbering	ARC_MAS51015				
Objectives of class					
All the students are required to	attend all the sen	ninars, which is arrai	nged by the laborate	ory supervisor for	the special study
subjects related to the current re	esearch activity of	the laboratory. The	scheduled program o	of the seminars is a	announced by the
supervisor at the guidance of the	e seminar.				
Contents of class					
In each seminar, students purs	sue several resea	rch topics and/or	undertake projects	collectively and	solely under the
instruction of the faculty member		•		concervery and	
Self Preparation and Review			cher departmentes.		
Related subjects					
Notes for textbook					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Goals to be achieved					
Evaluation of achievement					
Report					
Examination					
レポートで実施					
By Report					
Details of examination					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	es of learning and	education			
		oduoduon			
Key words					

## (M45630010)Elasticity and Stability[Elasticity and Stability]

Subject	Elasticity an	d Stability[Elasticity	and Stability]			
name[English] Schedule number	M45630010		Subject area	Advanced Architecture and Civil	Required or elective	Elective
Time of starting a	Fall term		Day of the	Engineering Tue.4~4	Credit(s)	2
course			week,period	100.4 4	01001(3/	2
Faculty	Graduate Pr	ogram for Master's D			Subject	1~
					grade	
Department Offered	Architecture	e and Civil Engineerin	g		Beggining grade	M1
Charge teacher	松本 幸大	MATSUMOTO Yukihi	ro		Brado	
name[Roman						
alphabet mark]						
Numbering	ARC_MAS52	2025				
Objectives of class						
Contents of class 1st – 6th week; Mecha Tensor Analysis in Car Stresses and Equilibriu Strain–Displacement F Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule	tesian Coordir ım Relations s in Isotropic E	nates lastic Materials	aterial			
Laminate theory						
12th – 15th week; Ela	astic buckling o	of bars and plates				
1st – 6th week; Mecha	nics of elastici	ity				
Tensor Analysis in Car	tesian Coordir	nates				
Stresses and Equilibriu	ım					
	Relations					
Strain-Displacement F	in Instropia E	lactic Materials				
Strain-Displacement F Constitutive Equations	s in isotropic E	lastic Materials				
-	-		aterial			
Constitutive Equations	-		aterial			
Constitutive Equations 7th - 11th week; Mech	-		aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory	nanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory	nanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule	nanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory	aanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela	aanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela <b>Self Preparation and F</b>	aanics of elasti	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela <b>Self Preparation and F</b>	aanics of elasti	city for composite m	aterial			
Constitutive Equations 7th - 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th - 15th week; Ela Self Preparation and F Related subjects	aanics of elasti	city for composite m	aterial			
Constitutive Equations 7th - 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th - 15th week; Ela Self Preparation and F Related subjects Notes for textbook	nanics of elasti astic buckling c Review	city for composite m	aterial			
Constitutive Equations 7th - 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th - 15th week; Ela Self Preparation and F Related subjects Notes for textbook Some handouts will be	aanics of elasti astic buckling o Review distributed.	city for composite m	aterial			
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela Self Preparation and F Related subjects Notes for textbook Some handouts will be Some handouts will be	aanics of elasti astic buckling o Review distributed. distributed.	city for composite m				079-
Constitutive Equations 7th - 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th - 15th week; Ela Self Preparation and F Related subjects Notes for textbook Some handouts will be Some handouts will be	aanics of elasti astic buckling o Review distributed.	city for composite m			ISBN	978-0070858206
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela Self Preparation and F Related subjects Notes for textbook Some handouts will be Some handouts will be	astic buckling o Review distributed. distributed. Book title	city for composite m of bars and plates Theory of plates an	nd shells	McConv 120		0070858206
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela Self Preparation and F Related subjects Notes for textbook Some handouts will be Some handouts will be	aanics of elasti astic buckling o Review distributed. distributed.	city for composite m		McGraw-Hill	Publish	
Constitutive Equations 7th – 11th week; Mech Orthotropic material Mixturing rule Laminate theory 12th – 15th week; Ela	astic buckling o Review distributed. distributed. Book title	city for composite m of bars and plates Theory of plates an	nd shells	McGraw-Hill Publishing Company		0070858206

	Book title	Theory of Elastic Stability			ISBN	978-
			-		0486472072	
	Author	S. Timoshenko	Publisher	Dover	Publish	2009
				Publications	year	
Reference3	Book title	Mechanics of Com	oosite Materials		ISBN	978-
						0486442396
	Author	Richard M.	Publisher	Dover	Publish	2005
		Christensen		Publications	year	
Notes for reference						
Goals to be achieve	d					
The primary purpos	e is to encoura	ige students to gain	the fundamenta	al concept and to	raise their po	tential abilities f
advanced and practi	cal applications i	n the future.				
The primary purpos	e is to encoura	ige students to gain	the fundamenta	al concept and to	raise their po	tential abilities f
advanced and practi	cal applications i	n the future.				
Evaluation of achiev	ement					
Based on reports						
Based on reports						
Examination						
レポートで実施						
By Report						
Details of examination	on					
Other information						
Reference URL						
	it.ac.ip/					
http://www.st.ace.tu						
http://www.st.ace.tu http://sel.ace.tut.ac.	ID/ V-matsum/					
http://www.st.ace.tu http://sel.ace.tut.ac, http://www.st.ace.tu						
http://sel.ace.tut.ac http://www.st.ace.tu	it.ac.jp/					
http://sel.ace.tut.ac	it.ac.jp/					
http://sel.ace.tut.ac http://www.st.ace.tu http://sel.ace.tut.ac	it.ac.jp/ jp/y-matsum/					

### (M45630090)Coastal Hydraulics[Coastal Hydraulics]

Subject name[English]	Coastal Hyd	raulics[Coastal Hydra	ulics]			
Schedule number	M45630090		Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Fall term		Day of the week.period	Thu.3~3	Credit(s)	2
Faculty	Graduate Pr	ogram for Master's De			Subject grade	1~
Department Offered	Architecture	and Civil Engineering	[		Beggining grade	M1
Charge teacher name[Roman alphabet mark]	加藤茂KA	TO Shigeru				1
Numbering	ARC MAS54	325				
Objectives of class		-				
To understand the ba including data analysis <b>Contents of class</b>	and numerical o	calculation.	and the advance	d knowledge of coa	stal process a	nd protection
1st(face to face): Introd						
2nd(face to face): Revie						
3rd(face to face): Basic 4th(face to face): Small	0					
5th(face to face): Small	-					
6th(face to face): Wave	•	•				
7th(face to face): Long			on (1)			
8th(face to face): Long						
9th(face to face): Statis	stical property	of wave				
10th(face to face): Sho	-					
11th(face to face): Sed						
12th(face to face): Sed						
13th(face to face): Num	-					
14th(face to face): Nun 15th(face to face): Sho	-	ς (Ζ)				
16th(face to face): Terr	-	tion				
(Attention)						
If there will be any cl	nanges regardi	ng Tovohashi Univers	sity of Technolog	w Activity Restriction	ons level for F	Preventing the
Spread of Corona virus						reventing the
	,					
Self Preparation and R	eview					
Self Preparation and R Self preparation and re		ure for around 90 mir	outes each are es	sential		
Self preparation and re	view of the lect			sential.		
•	view of the lect			sential.		
Self preparation and re Students can use the c	view of the lect listributed hand	out and some referen		sential.		
Self preparation and re Students can use the c Related subjects	view of the lect listributed hand	out and some referen		sential.		
Self preparation and re Students can use the c <b>Related subjects</b> Subjects related to hyc	view of the lect listributed hand	out and some referen		sential.		
Self preparation and re Students can use the c <b>Related subjects</b> Subjects related to hyc	view of the lect listributed hand	out and some referen		sential.		
Self preparation and re Students can use the c Related subjects Subjects related to hyd Notes for textbook	view of the lect listributed hand raulics and wat	out and some referen		sential.		
Self preparation and re Students can use the c <b>Related subjects</b> Subjects related to hyc	view of the lect listributed hand raulics and wat	out and some referen		sential.		
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie	view of the lect listributed hand raulics and wat	out and some referen		sential.		
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie	view of the lect listributed hand raulics and wat	out and some referen	ICES.		ISBN	
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie Lecture handouts will b	view of the lect listributed hand raulics and wat d. e distributed.	out and some referen	nces.	rs and Scientists -	ISBN	
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie Lecture handouts will b	view of the lect listributed hand raulics and wat d. e distributed.	out and some referen	nces.	rs and Scientists -	ISBN Publish year	
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie Lecture handouts will b	view of the lect listributed hand raulics and wat d. e distributed. Book title	Water Wave Mecha Advanced Series of Robert G. Dean & Robert A	anics for Engineer	rs and Scientists - ing - Vol. 2		
Self preparation and re Students can use the c Related subjects Subjects related to hyc Notes for textbook No textbook is specifie Lecture handouts will b	view of the lect listributed hand raulics and wat d. e distributed. Book title	er engineering Water Wave Mecha Advanced Series o Robert G. Dean &	anics for Engineer n Ocean Engineer <b>Publisher</b>	rs and Scientists - ing - Vol. 2 World Scientific		

		Advanced Series	on OceanEngine	ering – Vol. 16		
	Author	J. William	_	World Scientific	Publish year	
		Kamphuis				
Reference3	Book title	Basic Coastal Eng	gineering		ISBN	
	Author	Robert M Sorensen	Publisher	Kluwer Academic Publishers	Publish year	
Notes for reference	1	obrensen				
The reference books ar	e in the univer	sity library or in the	instructor's labo	ratory		
Other useful books are				lacory.		
Each student should st						
Goals to be achieved	ady doing foroi					
- Basic knowledge and	understanding	of the concept and t	theory of coastal	engineering		
- Understanding the pr	5		,	0 0		
Evaluation of achievem						
[Evaluation method]	one					
Reports(30%) & attenda	nce(10%) & Exa	amination(60%)				
Students are required t			to submit all as	signments for evaluation	'n	
More than four classes		•		Significants for evaluation	41. 	
Evaluation is based on				endance and examinati	on	
					on.	
Frankright (* 13						
[Evaluation criteria]						
S: 90 or higher						
A: 80 or higher to lower						
B: 70 or higher to lower						
C: 60 or higher to lower Examination	rthan 70					
定期試験を実施(対面)						
Examination(Face to Fa Details of examination	ice)					
N/A Other information						
Room : D-812						
E-mail : s-kato@ace.tu Reference URL	it.ac.jp.					
	• • • • • /					
https://www.umi.ace.tu	t.ac.jp/					
Office hours						
At any time.						
But please contact me			·			
Relations to attainment	CODJECTIVES OF	learning and educat	ion			
建築・都市システム学専						
(C)高度な知識を統合						
建築・都市システム学ま		分野に関する高度な	は知識を修得し,	それらを課題解決のた	めに統合的に活用で	きる実践
的・創造的能力を身につ						
(C1) 建築・都市システ	ム学およびその	)関連分野の理論・ቩ	芯用知識を自発的	りに獲得し, それらを統	合的に活用できる能	力を身に
つけている。						
N/A						
Graduate Program of A	rchitecture and	d Civil Engineering fo	r Master's Degre	e		
(C) Practical and creat	ve skills to util	ize advanced knowle	dge in an integra	ted manner		
Have advanced knowled	dge about arch	itecture and civil en	gineering as well	as related fields; and h	ave the practical and	l creative
skills to utilizesuch kno	wledge for prot	olem solving in an int	egrated manner			
(C1) Have the skills to	voluntarily ac	quire theories and a	pplied knowledge	e about architecture a	nd civil engineering a	s well as
related fields; and to ut	ilize such know	ladra in an interrate	-			
		neuge in an integrate	a manner			
Key words			a manner			

Subject name[English]         Advanced Structural System Planning and Design [         Advanced Structural System Planning and Design [           Schedule number         M45630190         Subject area         Advanced Architecture and Civil Engineering         Required or Architecture and Civil Engineering         Required or Architecture and Civil Engineering         Desgin (         Credit(s)         2           Faculty         Graduate Program for Master's Degree         Subject grade         1~         Desgin (         Desgin	(M45630190)Advanced Structura	I System Planning	and Design I[Advan	ced Structural Syste	em Planning and D	esign []
Ime of starting a course         Fall term         Day of the Intensive         elective and Oivil Engineering         elective           Time of starting a course         Fall term         Day of the Intensive         Credit(a)         2           Faculty         Graduate Program for Master's Degree         Subject grade         1~           Department Offred         Architecture and Oivil Engineering         Beggining         M1           Charge teacher nameRoman         SS系教務委員 Skei kyomu Iin-S         abhabet mark]         M1           Numboring         ARC, MASS2025         Uplectives of class         It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedu program of the seminar is announced by the supervisor at the guidance of the seminar.         Contents of class           Self Preparation and Review         Related subjects         It are set to be achieved         It are set to be achieved           Evaluation of achievement         Examination         It are set to be achieved         It are set to be achieved         It are set to be achieved           Evaluation of achievement         It are set to be achieved           Evaluation of achievement         It are set to be ach	Subject name[English]	_	ural System Planni	ng and Design I[Ad	vanced Structural	System Planning
weekperiod         Subject grade         1~           Department Offered         Architecture and Givil Engineering         Beggining grade         M1           Otherge tascher name[Roman alphabet mark]         SS系数務委員 Skei kyonu lin-S alphabet mark]         ARC_MASS2025         V           Numbering         ARC_MASS2025         Objectives of class         It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedu program of the seminars is announced by the supervisor at the guidance of the seminar.         Contents of class           Self Preparation and Review         Related subjects         It is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedu program of the seminars is announced by the supervisor at the guidance of the seminar.         Contents of class           Self Preparation and Review         Related subjects         It is arranged by laboratory supervisor for the special study subjects         It is arranged by laboratory supervisor for the seminar is announced by the supervisor at the guidance of the seminar.         It is arranged by laboratory supervisor for the seminar is announced by the supervisor at the guidance of the seminar.           Contents of class         Self Preparation and Review         It is arranged by laboratory supervisor for the seminar is announced by the supervisor at the guidance of the seminar is announced by the supervisor at the guidance of the	Schedule number	M45630190	Subject area	Architecture and Civil	-	Elective
Faculty         Graduate Program for Master's Degree         Subject grade         1~           Department Offered         Architecture and Givil Engineering         Begining grade         M1           Oharge teacher name[Roman alphabet mark]         SS系教務委員 Skei kyomu lin-S alphabet mark]         M1         M1           Numbering         ARC.MASS2025         Use of the seminars, which is arranged by the depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by the seminars is announced by the supervisor at the guidance of the seminar.         Contents of class           Self Proparation and Review         Self Proparation and Review         Self Proparation and Review         Self Proparation and Review           Related subjects         Notes for testbook         Self program is consistent of class         Self Proparation and Review           Related subjects         Self program is announced by the supervisor at the guidance of the seminar.         Self Program is its announced by the supervisor at the guidance of the seminar.         Self Program is its announced by the supervisor at the guidance of the seminar.           Related subjects         Notes for testbook         Self program is its announced by the supervisor at the guidance of the seminar.         Self program is its announced by the supervisor at the guidance of the seminar.           Related subjects         Notes for testbook         Self program is its announced by the supervisor is its announced is program is its announced by t	Time of starting a course	Fall term	-		Credit(s)	2
Department Offered         Architecture and Civil Engineering         Beggining grade         M1           Charge teacher name[Roma alphabet mark]         S5乘教務委員 5kei kyomu lin-S alphabet mark]         M1           Numbering         ARC_MASS2025             Objectives of class         It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedu program of the seminars is announced by the supervisor at the guidance of the seminar.         Contents of class           Self Preparation and Review         Related subjects             Notes for reference         Goals to be achieved             Evaluation of achievement              Ur4 ~- C'雲施 By Report         Details of examination             Other information         Reference URL              Office hours         Relations to attainment objectives of learning and education	Faculty	Graduate Program		ee	Subject grade	1~
Charge teacher name[Roman alphabet mark]         S5条教務委員 5kei kyomu lin-S           Anumbering         ARC_MAS52025           Objectives of class         It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special students under the guidance of the seminar.           Contents of class         It depends on the seminars is announced by the supervisor at the guidance of the seminar.           Contents of class         Self Preparation and Review           Related subjects         Notes for reference           Qoals to be achieved         Evaluation of achievement           Examination by Report         Details of examination           Other information         Reference URL           Office hours         Reference URL					Beggining	M1
Objectives of class           It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedu program of the seminars is announced by the supervisor at the guidance of the seminar.           Contents of class           Self Preparation and Review           Related subjects           Notes for textbook           Notes for textbook           Vectored           Evaluation of achievement           Examination           Unit – Togkin           By Report           Other information           Reference URL           Office hours           Relations to attainment objectives of learning and education		S5系教務委員 5	kei kyomu Iin−S			1
h depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The schedul program of the seminars is 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 achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Numbering	ARC_MAS52025				
Related subjects Notes for textbook Notes for reference Goals to be achieved Evaluation of achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	It depends on the laboratory. T laboratory supervisor for the spe program of the seminars is annou	ecial study subjects	s related to the cur	rent research activi		
Notes for textbook Notes for reference Goals to be achieved Evaluation of achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Self Preparation and Review					
Notes for reference Goals to be achieved Evaluation of achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Related subjects					
Goals to be achieved Evaluation of achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Notes for textbook					
Evaluation of achievement Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Notes for reference					
Examination レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Goals to be achieved					
レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Evaluation of achievement					
レポートで実施 By Report Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education	Examination					
By Report         Details of examination         Other information         Reference URL         Office hours         Relations to attainment objectives of learning and education						
Details of examination Other information Reference URL Office hours Relations to attainment objectives of learning and education						
Reference URL       Office hours       Relations to attainment objectives of learning and education						
Office hours Relations to attainment objectives of learning and education	Other information					
Relations to attainment objectives of learning and education	Reference URL					
	Office hours					
Key words	Relations to attainment objective	əs of learning and e	ducation			
Key words						
	Key words					

(M45630210)Advanced Environm	ental System Plann	ning and D	esign I[/	dvanced Environmer	ntal System Plannin	g and Design I
Subject name[English]	Advanced Enviro Planning and Des	_	System	Planning and Design	I[Advanced Enviro	onmental System
Schedule number	M45630210	Subject	area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Fall term	Day week,pe	of the priod		Credit(s)	2
Faculty	Graduate Program			ree	Subject grade	1~
Department Offered	Architecture and Civil Engineering Beggining M1 grade M1					
Charge teacher name[Roman alphabet mark]	S5系教務委員 5	kei kyomu	ı Iin-S			1
Numbering	ARC_MAS54025					
It depends on the laboratory. T laboratory supervisor for the spe program of the seminars is annou <b>Contents of class</b>	ecial study subjects	s related t	to the cu	rrent research activ		
Self Preparation and Review						
Related subjects						
Notes for textbook						
Notes for reference						
Goals to be achieved						
Evaluation of achievement						
Examination						
レポートで実施						
By Report						
Details of examination						
Other information						
Reference URL						
Office hours						
Relations to attainment objective	es of learning and e	ducation				
Key words						

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

Subject name[English]		onal System Planning			em Planning and
	Design I]				
Schedule number	M45630230	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Fall term	Day of the week,period	Intensive	Credit(s)	2
Faculty	Graduate Progra	am for Master's Degre	ee	Subject grade	1~
Department Offered	Architecture an	d Civil Engineering		Beggining grade	M1
Charge teacher name[Roman	S5系教務委員	5kei kyomu Iin-S		-	
alphabet mark]					
Numbering	ARC_MAS53025	j			
Objectives of class					
It depends on the laboratory. T					
laboratory supervisor for the spe				ty of the laborator	y. The scheduled
program of the seminars is annou	inced by the supe	rvisor at the guidance	e of the seminar.		
Contents of class					
Self Preparation and Review					
Related subjects					
Notes for textbook					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Examination					
レポートで実施					
By Report					
Details of examination					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	es of learning and	education			
Key words					

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

Subject name[English]	Seismic Design o	f Structures[Seismi	c Design of Structur	es]	
Schedule number	M45630290	Subject area	Advanced	Required or	Elective
			Architecture	elective	
			and Civil		
			Engineering		
Time of starting a course	Fall term	Day of the week,period	Wed.3~3	Credit(s)	2
Faculty	Graduate Program	n for Master's Degre	e	Subject grade	1~
Department Offered	Architecture and			Beggining	M1
				grade	
Charge teacher name[Roman	齊藤 大樹 SAIT	OH Taiki			l
alphabet mark]					
Numbering	ARC_MAS52125				
Objectives of class					
-					
Contents of class					
Contents of class					
Self Preparation and Review					
Related subjects					
Notes for textbook					
Notes for reference					
Notes for reference					
Goals to be achieved					
Evaluation of achievement					
Examination					
Details of examination					
Decails of examination					
0.1. 1.6					
Other information					
Reference URL					
Office hours					
Relations to attainment objective	s of learning and e	ducation			
Key words					

## (M45630330)Geohazards[Geohazards]

Subject name[English]	Geohazards[Geoh	nazards]						
Schedule number	M45630330	Subject area	a	Advanced	Required or	Elective		
	-			Architecture	elective			
				and Civil				
				Engineering				
Time of starting a course	Fall term	Day of	the	Thu.2~2	Credit(s)	2		
		week,period						
Faculty	Graduate Program	n for Master's	Degre	e	Subject grade	1~		
Department Offered	Architecture and	Civil Engineer	ing		Beggining	M1		
					grade			
Charge teacher name[Roman	松田 達也 MATS	SUDA Tatsuya						
alphabet mark]								
Numbering	ARC_MAS52725							
Objectives of class								
The objective is to understand th	e characteristics o	f natural disas	ters a	nd their damages.				
Contents of class								
1: (On-demand) Introduction								
2: (On-demand) Natural Disasters	3							
3: (On-demand) Earthquake Geol	ogy and Seismology	/						
4: (On-demand) Plate Techtonics	and Earthquake							
5: (On-demand) Earthquakes and	Structures Damag	ge						
6: (On-demand) Earthquakes and	Liquefaction of So	il						
7: (On-demand) Tsunami and Win	d-caused wave							
8: (On-demand) Protect in coasta	al area during wave:	S						
9: (On-demand) Typhoons, Hurric	anes, or Cyclone							
10: (On-demand) Coastal Erosion								
11: (On-demand) Heavy rain and	Flooding							
12: (On-demand) Levees Damage								
13: (On-demand) Landslides								
14: (On-demand) Slope Failure ar	nd Rockfall							
15: (On-demand) Debris flow								
If there will be any changes regar	ding Toyohashi Uni	versity of Tec	hnolo	gy Activity Restriction	ons Level for			
Preventing the Spread of Corona	virus, the course c	ontent and ev	aluati	on of achievement a	re subject to chan	ge.		
If there is any changes about a c	ass schedule, it wil	l be informed	via Go	ogle Classroom or k	YOMU JOHO SYS	STEM.		
Self Preparation and Review								
To enhance a learning effect, st	udents are encoura	aged to invest	igate	the natural hazards	and to prepare fo	or and review the		
lecture for around 90 minutes ea	ch.							
Related subjects								
Geotechnical Analysis, Advanced				0				
Geotechnical Analysis, Advanced	Geotechnical Engir	neering and Ha	azard	Mitigation				
Notes for textbook								
N⁄A								
Notes for reference								
	- Edition" Detailed 1	<b>A h h a + +</b>						
Refer to "Natural Disasters, Nint	n Edition Patrick L	Addott						
Goals to be achieved	E Ni-to - I - P		-l					
	es of Natural disasters and their damages.							
Evaluation of achievement	a rapart							
Report and the presentation of th								
S: Obtained total points, 90 or high								
A: Obtained total points, 80 or hig								
B: Obtained total points, 70 or hig								
C: Obtained total points, 60 or hi	giter (out of 100 pol	ints).						

Examination	
レポートで実施	
By Report	
Details of exami	nation
N⁄A	
Other informatio	n
office:D-808	
Tel:0532-44-684	9
E-mail:matsuda.t	atsuya.mp@tut.jp
Reference URL	
N⁄A	
Office hours	
12:00-13:00 on 7	hursday
建築・都市シスラ的・創造的能力を	を統合的に活用できる実践力・創造力 ・ム学およびその関連分野に関する高度な知識を修得し, それらを課題解決のために統合的に活用できる実践 を身につけている。 システム学およびその関連分野の理論・応用知識を自発的に獲得し, それらを統合的に活用できる能力を身に
	l creative skills to utilize advanced knowledge in an integrated manner knowledge about architecture and civil engineering as well as related fields; and have the practical and creative ch knowledge for problem solving in an integrated manner

# (M45630400)Environmental Control in Biology[Environmental Control in Biology]

Subject name[English]	Environmenta	Control in Biology	[Environment	al Control in Biology]		
Schedule number	M45630400		Subject area	Advanced	Required or	Elective
				Architecture and	elective	
				Civil Engineering		
Time of starting a	Fall term		Day of th		Credit(s)	2
course			week,period			
Faculty	Graduate Pro	gram for Master's D	Degree	L.	Subject	1~
					grade	
Department Offered	Architecture a	and Civil Engineerin	g		Beggining	M1
					grade	
Charge teacher	高山 弘太郎	東海林 孝幸 TAK	KAYAMA Kota	ro, TOKAIRIN Takayuk	i	
name[Roman alphabet						
mark]						
Numbering	ARC_MAS540	25				
Objectives of class						
(東海林担当部分)						
Exchange of momentum,	heat and gas b	etween plant canop	by and atmos	here is significant to e	evaluate eco-sys	tem and grobal
environment. This lectu	re will provide	mathematical tre	eatment of i	nteraction between bi	io-system (plan	t canopy) and
atmosphere, especially fo	cuses on transp	oort phenomena (m	omentu, heat	etc).		
(Prof. Takayama)						
Learn fundamentals of ac	lvanced agricult	ural engineering				
Contents of class						
Conconce of class						
Tokairin.						
1. Introduction						
2. Momentum transport						
3. Heat and mass transpo	ort					
4. Radiative environment	in plant canopy					
5. Heat budget of plant c	anpy					
6. Multi-layer canopy mo	del					
7. Report						
Prof. Takayama						
(1) (On-demand) Advance	od ogrioultural p	raduation in the we	rld			
			bria			
<ul><li>(2) Environmental control</li><li>(3) (On-demand) Environ</li></ul>	-		uction II			
(4) Measurement system						
		-		on of over Π		
(5) (On-demand) Measure	-		ind transpirat	on of crop II		
(6) Plant growth monitori			. п			
(7) (On-demand) Plant growth monitoring with imaging robot $II$						
If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for						
Preventing the Spread of the Corona virus, the course content and evaluation of achievement are subject to change.						
If there are any changes	to a class sche	dule, I will inform yo	ou on Google	Classroom or KYOMU 、	JOHO SYSTEM.	
Self Preparation and Rev	view					
Review each lecture.						
Related subjects						
calculus, linear algebra						
Textbook1	Book title	N/A			ISBN	
		1				1

	Author		Publisher		Publish year		
Notes for textbook							
プリント配布							
Handouts will be prepare	d by the lecture	r.					
Reference1	Book title	N/A			ISBN		
	Author		Publisher		Publish year		
Notes for reference							
特になし							
N/A							
Goals to be achieved							
(1) Acquire basic knowled	dra of advanced	l arrigultural anging	oring				
(2) Acquire adequate knowled	0	0		riculture			
(3) Acquire adequate kno	-		-				
·-/···		<b>,</b>					
Evaluation of achieveme	nt						
出席状況(50%)、演習		50%として評価す	-2				
S:上記の合計が 90 点			· <b>O</b> 0				
A:上記の合計が 80 点							
B:上記の合計が 70 点							
C:上記の合計が 60 点	(100 点満点)以	L					
[Evaluation basis] Studer	nts who attend a	all classes will be e	valuated as follo	ws:			
S: Total points obtained	from attendance	e and report, 90 or	higher (out of 10	00 points).			
A: Total points obtained		-	-	-			
B: Total points obtained		-	-				
C: Total points obtained	from attendance	e and report, 60 or	higher (out of 1	00 points).			
A: obtained total points of	-	-					
B: obtained total points of	-	-					
C: obtained total points of reports, 55 or higher (out of 100 points).							
Examination							
Examinadori レポートで実施							
レホートで実施 By Report							
Details of examination							
特になし							
N/A							
Other information							
特になし							
N/A							
Reference URL							
記述なし							
N/A							
Office hours							

随時

#### anytime

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

環境や生態系の保全に関して現れる場の方程式の定式化に関する能力を養い、それを数値的に解く手法について理解・修得 する。

(A)幅広い人間性と考え方

人間社会を地球的な視点から多面的にとらえるグローバルな感性を持ち、人間と自然との共生、公共の福祉について考える能 力を身につけている。

(C1) 建築・都市システム学およびその関連分野の理論・応用知識を自発的に獲得し、それらを統合的に活用できる能力を身につけている。

(E)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計画し学習する能力を身につけている。

(A) Personality and outlook with a broad perspective

Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare

(C1) Have the skills to voluntarily acquire theories and applied knowledge about architecture and civil engineering as well as related fields; and to utilize such knowledge in an integrated manner

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the skills to voluntarily make plans and learn throughout one's life in response to changesin society, environment and technology

Key words

Environmental control, Plant diagnosis, Robotization, Automation