Syllabus

International Master′s Degree Program

（2017-Fall Term）

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

Subject name[English]	Culture and Communication II[Culture and Communication II]				
Schedule number	M40030040	**Subject area**	General 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 Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	加藤 三保子 KATOH Mihoko				
Numbering	GEN_LIB51025				

Objectives of class

The primary purposes of this class are:
(1) To encourage students to express their views on Japanese culture and society.
(2) To raise the student's awareness of his/her own indigenous culture.
(3) To disseminate information about his/her culture.

Contents of class

Students will be offered an overview of contemporary Japanese culture.
Students will read and discuss the epics as follows:

Week 1: Introduction, Ambiguity and the Japanese
Week 2: The Concept of Japanese Dependence
Week 3: The Way of the Warrior
Week 4: Silence in Japanese Communication
Week 5: Male and Female Relationships in Japan
Week 6: Japanese Patience and Determination
Week 7: Japanese Social Obligations
Week 8: An Implicit Way of Communication in Japan
Week 9: Adopting Elements of Foreign Culture
Week 10: The Japanese Virtue of Modesty
Week 11: The Japanese Sense of Beauty
Week 12: Japanese Group Consciousness
Week 13: Presentation & discussion
Week 14: Presentation & discussion
Week 15: Presentation & discussion

During the term, students will choose a specific cultural issue to research and give a short oral presentation, exchange ideas about their research. At the end of the term, students are required to submit a summary of his/her presentation.

Self Preparation and Review

This course requires students proper preparation before each class. Participation is crucial.

Related subjects

Notes for textbook

No textbook is required for this course. All material will be provided.

Notes for reference

Goals to be achieved

(1) To understand Japanese Culture and Society.
(2) Enhance student's awareness of his/her own culture and society, and improve their ability to disseminate information about it to people from other cultures.

Evaluation of achievement

In-class work 20%, Oral presentation 50%, Written report (summary of presentation) 30%

Final grades will be given on an absolute scale:
80% or above: A
65% or above: B
55% or above: C

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

Details of examination
By individual presentation and report (summary of presentation)

Other information
Office: B-511
Phone (ext): 6959
E-mail: mihoko@las.tut.ac.jp

Reference URL

Office hours
Tuesdays 13:00-14:00
Thursdays 13:00-14:00

Relations to attainment objectives of learning and education

〇社会基盤コース

Key words
culture, communication

(M40030090)Principles of Japanese Grammar[Principles of Japanese Grammar]

Subject name[English]	Principles of Japanese Grammar[Principles of Japanese Grammar]				
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 Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	吉村　弓子 YOSHIMURA Yumiko				
Numbering	GEN_LIB54025				

Objectives of class

This course aims to provide an opportunity to understand an overview of elementary Japanese grammar for the very beginners. In order to concentrate on grammar, students will not learn Japanese letters and conversation. The course will be taught in English, and progress rapidly.

Contents of class

01 (10/05) Introduction to the course and general features of Japanese

02 (10/12) Pronunciation, Lesson 1: Copula, Particle "wa" [topic], and Declarative, negative, and interrogative sentence

03 (10/19) Lesson 2 and 3: Demonstratives and Particle "no" [possession]

04 (11/02) Lesson 4 and 5: Verbs, Tense (non-past and past), Particle "ni" [time], "kara [start], "made" [goal], "e" [direction], "de" [transportation], and "to" [cooperation]

05 (11/09) Lesson 6 and 7; Particle "o" [object], "de" [place][means], "ni" [goal][source]

06 (11/16) Lesson 8: Adjectives, Lesson 9: Particle "ga"[object]

07 (11/30) Lesson 10: Existence, Lesson 11: Numerals and Counter suffixes

08 (12/07) Lesson 12: Past tense of adjectives, Lesson 13: Adjectives of Desire

09 (12/14) Lesson 14 and 15: Verb groups, "te"-form of verbs, and Sentences using "te"-form

10 (01/11) Lesson 16: Sentences using "te"-form, Lesson 17: "nai"-form of verbs

11 (01/18) Lesson 18: Dictionary form of verbs, Lesson 19: "ta"-form of verbs

12 (01/25) Lesson 20: Polite and plain style, Lesson 21: Indirect speech

13 (02/01) Lesson 22: Noun modification

14 (02/08) Lesson 23: Complex sentence using "toki", Lesson 25: Subjunctive mood

15 (02/15) Lesson 24: Exchanging things or kindness

16 (03/01) Final exam

Self Preparation and Review

Read the respective parts of the textbook in advance.
Memorize the sentences learned in every class meeting to prepare for the next class's quiz.

Related subjects

Non-credit course "Basic Japanese" will cover the main textbook:
In the class "Basic Grammar" of the course, students will learn Exercise A and B.
In the class "Basic Conversation" of the course, students will be taught Exercise C and Conversation.
For more information, contact International Affairs Division.

Textbook1	**Book title**	Minna no Nihongo (Elementary Japanese I, 2nd Edition) Translation & Grammar Notes-English, Romanized Version			**ISBN**	978-4-88319-629-6
	Author		**Publisher**	3A Corporation	**Publish year**	2013

Notes for textbook

Each lesson consists of 1)vocabulary, 2)translation of the main textbook, 3)useful words and information, and 4)grammar notes.
1)Vocabulary and 4)grammar notes only will be taught in the course.

Notes for reference

Goals to be achieved

At the end of this course students will be able
1) to know pronunciation of Japanese language.
2) to understand pronunciation and meaning of elementary Japanese vocabulary.
3) to grasp an overview of elementary Japanese grammar.

Evaluation of achievement

Grading Policy: Quizes 30%, Final exam 70%
A: The total score is 80 or more.
B: The total score is between 65 and 79.99.
C: The total score is between 55 and 64.99.

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

Other information

Reference URL

Office hours

Office Hour
Friday 11:00-12:00
By appointment 08:30-12:00, 13:30-16:30 on weekday will be available.

Relations to attainment objectives of learning and education

Key words

elementary Japanese, grammar

(M40110020)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	M40110020	**Subject area**	General courses	**Required or elective**	Required
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 原 邦彦, 上野 未貴 kyoumu iinkai fukuiintyou, HARA Kunihiko, UENO Miki				
Numbering	COM_MAS51015				

Objectives of class

Assist graduate students as they undertake research activities and promote an understanding of the inherent ethical problems; lead students to think independently and exercise normative consciousness of research ethics through ethics education in research in accordance with goals of scientific education and research and characteristics of individual research specialties.

Contents of class

* 1st week: Introduction, 1st module("Research Misconduct") in e-learning
* 2nd – 6th week: 2nd – 7th modules in e-learning
– 2nd week: "Ethical Issues in the Management of Data in Engineering Research"
– 3rd week: "Responsible Authorship"
– 4th week: "Ethical Issues in the Peer Review and Publication of Engineering Research" & "Collaborative Research in Engineering Fields"
– 5th week: "Whistleblowing and the Obligation to Protect the Public"
– 6th week: "Managing Public Research Funds"
* ~7th week: Discussion with supervisor
* 8th week: make a final report

Self Preparation and Review

Students will need to refer to their textbook to prepare for and review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

Notes for reference

For the Sound Development of Science ?The Attitude of a Conscientious Scientist
Japan Society for the Promotion of Science Editing Committee , MARUZEN PUBLISHING
2015 ISBN978-4-621-08938-5
(PDF:https://www.jsps.go.jp/j-kousei/data/rinri.pdf)

Goals to be achieved

To prevent misconduct and promote fair research activities, this course provides knowledge and techniques regarding research ethics in accordance with characteristics of each graduate student's research specialties.

Evaluation of achievement

[Evaluation method] Final exam(100%)
[Evaluation basis]
Those who take and pass the short test after each unit of e-learning contents will be evaluated with following basis.
A: Achieved all goals and obtained 80 points or higher (out of 100) as total score of exams
B: Achieved most goals and obtained 65 points or higher (out of 100) as total score of exams
C: Achieved more than half of specified goals and obtained 55 points or higher (out of 100) as total score of exams

Examination

レポートで実施
By Report

Details of examination

By report

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

機械工学専攻
(B)技術者としての正しい倫理観と社会性
技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力
電気・電子情報工学専攻
(B)技術者としての正しい倫理観と社会性
技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力
情報・知能工学専攻
(B)技術者としての正しい倫理観と社会性
技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力
環境・生命工学専攻
(B)技術者としての正しい倫理観と社会性
技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力
建築・都市システム学専攻
(B)技術者としての正しい倫理観と社会性
実践的・創造的・指導的な技術者としての社会的・倫理的責任を自覚し，技術的課題を解決する能力

Key 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 Mechanical Engineering I[Seminar on Mechanical Engineering I]				
Schedule number	M41610010	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS51015				

Objectives of class

The seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering II[Seminar on Mechanical Engineering II]				
Schedule number	M41610020	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS61015				

Objectives of class

The seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical 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 Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS61015				

Objectives of class

The thesis research aims to provide a practical experience of research work, and to acquire research skills with a deep understanding of relevant knowledge.

Contents of class

The research subject depends on the supervisor and the research group you join. Individual students will have different research subjects. Discuss with your supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop your research skills including planning and presentation skills.

Evaluation of achievement

Examination

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical 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 Program for Master's Degree			**Subject grade**	1～1
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員, 1系各教員 1kei kyomu Iin-S, 1kei kakukyouin				
Numbering	MEC_MAS61015				

Objectives of class

The thesis research aims to provide a practical experience of research work, and to acquire research skills with a deep understanding of relevant knowledge.

Contents of class

The research subject depends on the supervisor and the research group you join. Individual students will have different research subjects. Discuss with your supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop your research skills including planning and presentation skills.

Evaluation of achievement

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]				
Schedule number	M4161003T	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員, 1系各教員 1kei kyomu Iin-S, 1kei kakukyouin				
Numbering	MEC_MAS61015				

Objectives of class

The thesis research aims to provide a practical experience of research work, and to acquire research skills with a deep understanding of relevant knowledge.

Contents of class

The research subject depends on the supervisor and the research group you join. Individual students will have different research subjects. Discuss with your supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop your research skills including planning and presentation skills.

Evaluation of achievement

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering[Seminar on Mechanical Engineering]				
Schedule number	M41610040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS61015				

Objectives of class

The seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

(M41610050)Internship[Internship]

Subject name[English]	Internship[Internship]				
Schedule number	M41610050	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	0
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS51015				

Objectives of class

Students are expected to address problems in a specialized field in a company or research institute. The objectives of this subject are to experience practical research and development and to cultivate the practical problem-solving ability, planning ability, and creativity.

Contents of class

In order to cultivate the practical problem-solving ability, academic and company/institutional supervisors will provide practical problems in a specialized field through close communication.

Self Preparation and Review

Studens are expected to discuss a preferable intership topic with supervisors before starting it.

Related subjects

Notes for textbook

Follow instructions provided by company/institutional supervisors.

Notes for reference

Goals to be achieved

While engaging practical activities in a company or research institution for several months, students are expected to improve the practical problem-solving ability, planning ability, and creativity as well as an international way of thinking.

Evaluation of achievement

Comprehensive evaluation based on students' reports and evaluation sheets by academic and company/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

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M41630040)Micromachining Engineering[Micromachining Engineering]

Subject name[English]	Micromachining Engineering[Micromachining Engineering]				
Schedule number	M41630040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	MEC_MAS53025				

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

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.
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/

Reference1	**Book title**	Fundamentals of Microfabrication (2nd ed.): The Science of Miniaturization			**ISBN**	9780849308260
	Author	Marc J. Madou	**Publisher**	CRC Press	**Publish year**	2002
Reference2	**Book title**	Introduction to Microfabrication			**ISBN**	9780470851067
	Author	Sami Franssila	**Publisher**	John Wiley & Sons	**Publish year**	2004
Reference3	**Book title**	The MEMS Handbook (2nd ed.)			**ISBN**	9780849321061
	Author	Mohamed Gad-el-Hak	**Publisher**	CRC Press	**Publish year**	2006

Notes for reference

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:
A: Achieved all goals and obtained total points on the above evaluation, 80 or higher (out of 100 points).
B: Achieved 75 % of goals and obtained total points on the above evaluation, 65 or higher (out of 100 points).
C: Achieved 50 % of goals and obtained total points on the above evaluation, 55 or higher (out of 100 points).

Examination

授業を実施
Regular Class

Details of examination

Other information

Reference URL

https://www.tut.ac.jp/english/schools/faculty/me/64.html

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Time-frequency Analysis and Wavelet Transform[Time-frequency Analysis and Wavelet Transform]				
Schedule number	M41630120	**Subject area**	Advanced Mechanical 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 Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	章 忠 SHO Tadashi				
Numbering	MEC_MAS55025				

Objectives of class

To obtain advanced knowledge of time-frequency analysis and image processing by utilizing wavelet transform.

To obtain advanced knowledge of time-frequency analysis and image processing by utilizing wavelet transform.

Contents of class

1. Basic theory of time-frequency analysis method will be briefly discussed.
1)Shot-Time Fourier transform
2)The Wigner-Ville Distribution
3)Hilbert Transform and instantaneous frequency analysis
4)Wavelet transform
2.Application of the wavelet Transform will be briefly discussed.
1) Time series signal analysis
2) Image processing
3) Abnormal detection
4) Surface inspection

1. Basic theory of time-frequency analysis method will be briefly discussed.
1)Shot-Time Fourier transform
2)The Wigner-Ville Distribution
3)Hilbert Transform and instantaneous frequency analysis
4)Wavelet transform
2.Application of the wavelet Transform will be briefly discussed.
1) Time series signal analysis
2) Image processing
3) Abnormal detection
4) Surface inspection

Self Preparation and Review

Related subjects

Basic knowledge of the signal analysis

Basic knowledge of the signal analysis

Notes for textbook

Materials will be perpared by lecturer.

Materials will be perpared by lecturer.

Reference1	**Book title**	Frontiers in computing technologies for Manufacturing applications			**ISBN**	
	Author	Y. Shimizu , Z. Zhang, R. Batres	**Publisher**	Springer	**Publish year**	2007
Reference2	**Book title**	Wavelets and analysis			**ISBN**	
	Author	M. Holschneider	**Publisher**	Oxford University Press	**Publish year**	
Reference3	**Book title**	Time-Frequency Analysis			**ISBN**	

	Author	R.L. Allen, D.W. Mills	Publisher	IEEE Press	Publish year	

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Interim report (50%) and term-end report (50%)

Interim report (50%) and term-end report (50%)

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

Wavelet transform, Time-frequency analysis

Wavelet transform, Time-frequency analysis

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

Subject name[English]	Advanced Mechanical Systems Design I[Advanced Mechanical Systems Design I]				
Schedule number	M41630210	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS53025				

Objectives of class

This lecture aims to provide a broad understanding of the mechanical systems design available for the master thesis research work of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	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 Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS54025				

Objectives of class

This lecture aims to provide a broad understanding of the materials and manufacturing process available for the master thesis research work of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced System, Control and Robotics I[Advanced System, Control and Robotics I]				
Schedule number	M41630250	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS55025				

Objectives of class

This lecture aims to provide a broad understanding of the control and robotics available for the master thesis research work of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Energy and Environmental Engineering I[Advanced Energy and Environmental Engineering I]				
Schedule number	M41630270	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS56025				

Objectives of class

This lecture aims to provide a broad understanding of the energy and environmental engineering available for the master thesis research work of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

To acquire fundamental knowledge of individual research fields.
To acquire the ability to find problems, the ability to solve the problems, and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

(M41630320)Properties and Applications of Engineering Materials[Properties and Applications of Engineering Materials]

Subject name[English]	Properties and Applications of Engineering Materials[Properties and Applications of Engineering Materials]				
Schedule number	M41630320	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	三浦　博己 MIURA Hiromi				
Numbering	MEC_MAS54015				

Objectives of class

Properties and applications of engineering materials, especially of metallic ones, are introduced and discussed. Trough the discussion and weekly reports, basic knowledge about engineering materials would be acquired.

Contents of class

Properties and applications of engineering materials are introduced and discussed. Discussions on the reports are mainly carried out, which are prepared in advance according to weekly subjects.

Self Preparation and Review

Basic knowledge on metallic materials is mandatory.

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Understand and obtain basic knowledge about properties and applications of engineering materials.

Evaluation of achievement

Weekly reports and discussion 100%
Evaluation according to TUT standard.

Examination

授業を実施
Regular Class

Details of examination

No final test.

Other information

Reference URL

Office hours

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，自然と人間との共生，人類の幸福・健康・福祉について考える能力
(C)工学的知識の獲得とその発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し，発展的に活用できる能力
(F)最新の技術や社会環境の変化に対する探究心と持続的学習力
社会，環境，技術等の変化に対応して，生涯にわたって自発的に学習する能力

Key words
Metallic materials, appication

(M41630333)Advances in Mechanical Design[Advances in Mechanical Design]

Subject name[English]	Advances in Mechanical Design[Advances in Mechanical Design]				
Schedule number	M41630333	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2+Spring1	**Day of the week,period**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	河村 庄造, 柴田 隆行 KAWAMURA Shozo, SHIBATA Takayuki				
Numbering	MEC_MAS53025				

Objectives of class

Fall 2 : Micromachining Engineering (Shibata)
"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.

Spring 1 : Vibration Engineering (Kawamura)
This lecture will provide the knowledge of modal analysis method and component mode synthesis method to treat a huge degree of freedom system.

Fall 2 : Micromachining Engineering (Shibata)
"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.

Spring 1 : Vibration Engineering (Kawamura)
This lecture will provide the knowledge of modal analysis method and component mode synthesis method to treat a huge degree of freedom system.

Contents of class

Fall 2 : Micromachining Engineering (Shibata)
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

Spring 1 : Vibration Engineering (Kawamura)
Modal analysis for multi degree of freedom system
1: Introduction of modal analysis, undamped system
2: A system with proportional viscous damping (1)
3: A system with proportional viscous damping (2)
4: Compensate of higher vibration modes

Component mode synthesis method
5: Formulation of sub-systems
6: Modal synthesis using constraint modes (1)
7: Modal synthesis using constraint modes (2)
8: Modal synthesis using non-constraint modes
Fall 2 : Micromachining Engineering (Shibata)
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

Spring 1 : Vibration Engineering (Kawamura)
Modal analysis for multi degree of freedom system
1: Introduction of modal analysis, undamped system
2: A system with proportional viscous damping (1)
3: A system with proportional viscous damping (2)
4: Compensate of higher vibration modes

Component mode synthesis method
5: Formulation of sub-systems
6: Modal synthesis using constraint modes (1)
7: Modal synthesis using constraint modes (2)
8: Modal synthesis using non-constraint modes

Self Preparation and Review

Fall 2 : Micromachining Engineering (Shibata)
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/

Spring 1 : Vibration Engineering (Kawamura)
Self-preparation and review are necessary.
Fall 2 : Micromachining Engineering (Shibata)
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/

Spring 1 : Vibration Engineering (Kawamura)
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
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
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

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:
A: Achieved all goals and obtained total points on the above evaluation, 80 or higher (out of 100 points).
B: Achieved 75 % of goals and obtained total points on the above evaluation, 65 or higher (out of 100 points).
C: Achieved 50 % of goals and obtained total points on the above evaluation, 55 or higher (out of 100 points).

Spring 1 : Vibration Engineering (Kawamura)
Method: report (full score 100).
Level: achievement in the case upper 55 points.
Level A: upper 80 points, Level B: upper 65 points, Level C: upper 55 points

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:
A: Achieved all goals and obtained total points on the above evaluation, 80 or higher (out of 100 points).
B: Achieved 75 % of goals and obtained total points on the above evaluation, 65 or higher (out of 100 points).
C: Achieved 50 % of goals and obtained total points on the above evaluation, 55 or higher (out of 100 points).

Spring 1 : Vibration Engineering (Kawamura)
Method: report (full score 100).
Level: achievement in the case upper 55 points.
Level A: upper 80 points, Level B: upper 65 points, Level C: upper 55 points

Examination

レポートで実施
By Report

Details of examination

Note:
Fall 2 : Micromachining Engineering (Shibata)
Regular Class (Presentation and discussion)

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
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

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.
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

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

(M41630340)Advances in Material Science and Manufacturing[Advances in Material Science and Manufacturing]

Subject name[English]	Advances in Material Science and Manufacturing[Advances in Material Science and Manufacturing]				
Schedule number	M41630340	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2+Spring1	**Day of the week,period**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	三浦　博己, 福本　昌宏 MIURA Hiromi, FUKUMOTO Masahiro				
Numbering	MEC_MAS55025				

Objectives of class

- Understanding of properties and applications of engineering materials
- To understand fundamentals of advanced technology in materials joining, especially both in high performance thick coating formation by Thermal Spraying, Cold Spraying, Aero-sol Deposition, and in non-melting diffusion bonding by Friction Stir Welding.
- Understanding of properties and applications of engineering materials
- To understand fundamentals of advanced technology in materials joining, especially both in high performance thick coating formation by Thermal Spraying, Cold Spraying, Aero-sol Deposition, and in non-melting diffusion bonding by Friction Stir Welding.

Contents of class

1. Engineering materials and manufacturing processes
2. Crystal structures
3. Defects in crystals
4. Diffusion in sold
5. Phase diagrams of alloys
6. Strengthening of metallic materials
7. Composites
8. Half term exam
9. Fundamental of surface modification process and technology
10. Fundamentals of thermal spray process, Splat formation problem
11. Process control with Transition temperature & Transition pressure
12. Cold spraying and Aero-sol deposition process, Functional materials coating: photocatalyst, SOFC, nano coating, intermetallic compound coating, etc.
13. Fundamental of Friction Stir Welding
14. Joining between disimillar materials by FSW
15. Friction spot welding, practical applications of FSW
16. Summarize and term-end report

1. Engineering materials and manufacturing processes
2. Crystal structures
3. Defects in crystals
4. Diffusion in sold
5. Phase diagrams of alloys
6. Strengthening of metallic materials
7. Composites
8. Half term exam
9. Fundamental of surface modification process and technology
10. Fundamentals of thermal spray process, Splat formation problem
11. Process control with Transition temperature & Transition pressure
12. Cold spraying and Aero-sol deposition process, Functional materials coating: photocatalyst, SOFC, nano coating, intermetallic compound coating, etc.
13. Fundamental of Friction Stir Welding
14. Joining between disimillar materials by FSW
15. Friction spot welding, practical applications of FSW

16. Summarize and term-end report

Self Preparation and Review

Basic knowledge necessary to understand lecture. Please read books suggested bellow in advance.

Basic knowledge necessary to understand lecture. Please read books suggested bellow in advance.

Related subjects

Basic knowledge on materials joining process is desirable.

Basic knowledge on materials joining process is desirable.

Notes for textbook

- Lecture using ppt.
- Handouts will be prepared for participants.

(Reference)

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

- Lecture using ppt.
- Handouts will be prepared for participants.

(Reference)

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

Reference1	**Book title**	Materials science and engineering			**ISBN**	978-1-118-31922-2
	Author	W.D.Callister Jr and D.G.Rethwisch	**Publisher**	Willy	**Publish year**	2017
Reference2	**Book title**	Foundations of materials science and engineering			**ISBN**	978-007-131114-4
	Author	W.F. Smith and J.Hashemi	**Publisher**	Mc Graw Hill	**Publish year**	2011

Notes for reference

Goals to be achieved

1) Understanding of properties and applications of engineering materials explained in the lectures
2) Understand following items;
-Joining mechanism between dissimilar materials
-Features and mechanism of various joining methods
-Features and mechanism of thick and thin film coating
-Features of functionally gradient material and composite material

1) Understanding of properties and applications of engineering materials explained in the lectures
2) Understand following items;
-Joining mechanism between dissimilar materials
-Features and mechanism of various joining methods
-Features and mechanism of thick and thin film coating
-Features of functionally gradient material and composite material

Evaluation of achievement

- Short tests 50%, Final exam. 50%
- Interim report (10%) and term-end report (90%).

- Short tests 50%, Final exam. 50%
- Interim report (10%) and term-end report (90%).

Examination

レポートで実施

By Report

Details of examination

Other information

Masahiro Fukumoto:
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Hiromi Miura:
Room: D-508, ext.: 6697, e-mail: miura@me.tut.ac.jp

Masahiro Fukumoto:
Room: D-503, ext.: 6692, e-mail: fukumoto@tut.jp
Hiromi Miura:
Room: D-508, ext.: 6697, e-mail: miura@me.tut.ac.jp

Reference URL

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(miura) http://www.str.me.tut.ac.jp/
(fukumoto) http://isf.me.tut.ac.jp/
(miura) http://www.str.me.tut.ac.jp/

Office hours

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(fukumoto)anytime to e-mail address: fukumoto@tut.jp
(miura) anytime to e-mail address: miura@me.tut.ac.jp

Relations to attainment objectives of learning and education

（C）工学的知識の獲得とその発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し，発展的に活用できる能力

Key words

Joining in dissimilar maretials, Surface modification, Thermal spraying, Cold spraying, FSW
Joining in dissimilar maretials, Surface modification, Thermal spraying, Cold spraying, FSW

(M41630353)Advances in Thermal and Fluid Mechanics[Advances in Thermal and Fluid Mechanics]

Subject name[English]	Advances in Thermal and Fluid Mechanics[Advances in Thermal and Fluid Mechanics]				
Schedule number	M41630353	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.1 ～ 1,Tue.2 ～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	飯田　明由, 柳田　秀記 IIDA Akiyoshi, YANADA Hideki				
Numbering	MEC_MAS56025				

Objectives of class

Applied Combustion Engineering by Professor Noda:
The global environment is a subject we must consider in our engineering activities. Some pollutions come from combustion and disperse into the atmosphere. Such phenomena take place in turbulent reacting flows. In the class, the mathematical treatment of such flows will be lectured. In paticular, we focus on modeling of turbulent combustion based on stochastic methods.

フルードパワー工学(柳田)
加圧した流体(油, 空気, 水など)を利用して機械的な仕事を取り出すシステムであるフルードパワー機器・システムに関して, 基礎的事項, 機器を接続する管路内流体の動特性, フルードパワーに関する最近のトピックスについて講義する.
Applied Combustion Engineering by Professor Noda:
The global environment is a subject we must consider in our engineering activities. Some pollutions come from combustion and disperse into the atmosphere. Such phenomena take place in turbulent reacting flows. In the class, the mathematical treatment of such flows will be lectured. In paticular, we focus on modeling of turbulent combustion based on stochastic methods.

Fluid power engineering by Prof.Yanada:
Fluid power systems utilize pressurized fluid (oil, air, water) to transfer power and output mechanical power through fluid power actuators. In this class, students acquire knowledge of structures and theories of fluid power components and systems as well as dynamics of fluid in pipelines. In addition, students acquire information on recent topics of fluid power engineering.

Contents of class

Applied Combustion Engineering by Professor Noda:
1.Introduction
2.Premixed combustion
3.Nonpremixed combustion
4.Turbulent combustion
5.Statistical description of turbulent combustion
6.Flamelet model
7.Probability density function(pdf) model
8.Examination

フルードパワー工学(柳田担当)
1週目:フルードパワーシステムの概要
2週目:各種機器の基礎理論
3週目:機器および回路の効率
4週目:管路の動特性(一次元波動方程式)
5周目:管路の動特性(一次元波動方程式の解, 水撃現象)
6周目:管路の動特性(非定常層流, 周波数応答)
7週目:フルードパワーに関する最近の話題
8週目:フルードパワーに関する最近の話題(45 分), 試験(45 分)

本講義は隔年で開講される.
Applied Combustion Engineering by Professor Noda:
1.Introduction
2.Premixed combustion
3.Nonpremixed combustion
4.Turbulent combustion

5.Statistical description of turbulent combustion
6.Flamelet model
7.Probability density function(pdf) model
8.Examination

Fluid poer engineering by Prof.Yanada:
1st week: One-dimensional wave equation and its solution in time domain for lossless lines
2nd week: Water hammer phenomenon
3rd week: Solution of wave equation in Laplace domain
4th week: Steady friction model and unsteady friction model, Propagation constant
5th week: Oscillatory laminar flow in pipe
6th week: Hydraulic impedance, reflection coefficient, and frequency response analysis
7th week: Characteristics method
8th week: Examination

This class is opened in alternate years, thus see the teaching schedule.

Self Preparation and Review
毎回の講義内容を復習するとともに，次回の内容についてテキスト等を参考に予習してくること。
Students are requested to review each class and prepare the next class by reading the teaching material.

Related subjects
Applied Combustion Engineering by Professor Noda:
Fundamental knowledge of the fluid dynamics is required, but the statistics and the stochastics will be lectured with basic contents.

Fluid power engineering by Prof.Yanada:
Fluid mechanics, Mechanics, Laplace transform
Applied Combustion Engineering by Professor Noda:
Fundamental knowledge of the fluid dynamics is required, but the statistics and the stochastics will be lectured with basic contents.

Fluid power engineering by Prof.Yanada:
Fluid mechanics, Mechanics, Laplace transform

Notes for textbook
プリント配布

Prints will be distributed.

Reference1	**Book title**	Principles of Combustion			**ISBN**	
	Author	Kuo,K.K.	**Publisher**	John Wiley & Sons	**Publish year**	
Reference2	**Book title**	Fluid Transients in Systems			**ISBN**	
	Author	Wylie, Streeter, Lisheng	**Publisher**	McGraw-Hill	**Publish year**	

Notes for reference

Goals to be achieved
Applied Combustion Engineering by Professor Noda:
Governing equations of turbulent combustion are derivable from fundamental equations.

フルードパワー工学(柳田):
1. フルードパワー機器の構造と特性について理解する.
2. フルードパワー機器・回路の出力や効率などが計算できる.
3. 1 次元の波動現象に対する理解を深める.
4. 水撃現象について理解する.
5. フルードパワーシステムにかかわる最近の話題について理解する.
Applied Combustion Engineering by Professor Noda:
Governing equations of turbulent combustion are derivable from fundamental equations.

Fluid power engineering by Prof.Yanada:

1.To understand structures and characteristics of fluid power components
2.To be able to calculate output and efficiency of fluid power components and systems
3.To be able to derive basic equations of fluid in pipeline
4.To understand water/oil hammer
5.To understand recent topics of fluid power systems

Evaluation of achievement

Applied Combustion Engineering by Professor Noda:
Evaluation is based on reports.

フルードパワー工学(柳田):
レポート(50 点), 試験(50 点)の割合で成績を評価する.

両教授の評価の平均値が最終評価となる.
Applied Combustion Engineering by Professor Noda:
Evaluation is based on reports.

Fluid power engineering by Prof.Yanada:
Written reports:50%, Examination:50%

The average mark of the two professors' evaluations is the final evaluation.
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

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

電卓を必ず持参すること.
Each student has to take a calculator with him/her.

Other information

Prof.Noda
Room: D411, Tel.(Ext.): 6681, e-mail: noda@me.tut.ac.jp

Prof.Yanada
Room: D309, Tel.(Ext.): 6668, e-mail: yanada@me.tut.ac.jp
Prof.Noda
Room: D411, Tel.(Ext.): 6681, e-mail: noda@me.tut.ac.jp

Prof.Yanada
Room: D309, Tel.(Ext.): 6668, e-mail: yanada@me.tut.ac.jp

Reference URL

Prof.Noda http://www.me.tut.ac.jp/ece/main_en.html
Prof.Yanada http://www.tut.ac.jp/english/schools/faculty/me/13.html
Prof.Noda http://www.me.tut.ac.jp/ece/main_en.html
Prof.Yanada http://www.tut.ac.jp/english/schools/faculty/me/13.html

Office hours

Prof.Noda: Any time in afternoon
Prof.Yanada: Basically, any time is OK. The time for discussion can be determined through e-mails when Prof.Yanada is abscent from his office.
Prof.Noda: Any time in afternoon
Prof.Yanada: Basically, any time is OK. The time for discussion can be determined through e-mails when Prof.Yanada is abscent from his office.

Relations to attainment objectives of learning and education

(C)工学的知識の獲得とその発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し, 発展的に活用できる能力

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

(M41630380)Robotics[Robotics]

Subject name[English]	Robotics[Robotics]				
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 Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering	MEC_MAS55025				

Objectives of class

Provides fundamentals of robotics, i.e., kinematics, dynamics and motion control of multiple rigid-bodies connected in series with revolute or prismatic joints.

Contents of class

1. Representation and transformation of positions and orientations in 3-D space
1-1. Description of positions and orientations in 3-D space.
1-2. Transformation of positions and orientations of rigid-objects.
1-3. Properties of transformation matrix.
2. Kinematics
2-1. Description of relative positions and orientations of manipulator links.
2-2. Transformation of manipulator positions and orientations.
2-3. Inverse kinematics.
3. Velocities and static forces
3-1. Linear and rotational velocities of rigid-objects.
3-2. Velocities of manipulator links.
3-3. Static forces in manipulators.
4. Dynamics
4-1. Review of rigid-body dynamics.
4-2. Newton-Euler and Lagrangian formulations of manipulator dynamics.
5. Control
5-1. Linear control.
5-2. Nonlinear control.

Self Preparation and Review

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra, mechanics and control theory.

Notes for textbook

Handouts will be prepared.

Reference1	**Book title**	Introduction to Robotics: Mechanics and Control, 3rd Edition			**ISBN**	
	Author	J. J. Craig	**Publisher**	Prentice Hall	**Publish year**	2005
Reference2	**Book title**	Robot Modeling and Control			**ISBN**	
	Author	M. W. Spong, S. Hutchinson, M. Vidyasagar	**Publisher**	John Wiley & Sons	**Publish year**	2006

Notes for reference

Goals to be achieved

Be able to derive kinematics and dynamics of robotic manipulators.
Be able to design motion controllers for robotic manipulators.

Evaluation of achievement

Grade will be determined only from the end-of-term exam score.

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information
Office: Room D-406, E-mail uchiyama@tut.jp

Reference URL

Office hours
Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

(M41630400)Robot Kinematics[Robot Kinematics]

Subject name[English]	Robot Kinematics[Robot Kinematics]				
Schedule number	M41630400	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering	MEC_MAS55025				

Objectives of class

Provides fundamental kinematics of robotic manipulators (multiple rigid-bodies connected in series with revolute or prismatic joints).

Contents of class

1. Representation and transformation of positions and orientations in 3-D space
1-1. Description of positions and orientations in 3-D space.
1-2. Transformation of positions and orientations of rigid-objects.
1-3. Properties of transformation matrix.
2. Kinematics
2-1. Description of relative positions and orientations of manipulator links.
2-2. Transformation of manipulator positions and orientations.
2-3. Inverse kinematics.
3. Velocities and static forces
3-1. Linear and rotational velocities of rigid-objects.
3-2. Velocities of manipulator links.
3-3. Static forces in manipulators.

Self Preparation and Review

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra and mechanics.

Notes for textbook

Handouts will be prepared.

Reference1	**Book title**	Introduction to Robotics: Mechanics and Control, 3rd Edition			**ISBN**	
	Author	J. J. Craig	**Publisher**	Prentice Hall	**Publish year**	2005
Reference2	**Book title**	Robot Modeling and Control			**ISBN**	
	Author	M. W. Spong, S. Hutchinson, M. Vidyasagar	**Publisher**	John Wiley & Sons	**Publish year**	2006

Notes for reference

Goals to be achieved

Be able to derive kinematics of robotic manipulators.

Evaluation of achievement

Grade will be determined only from the end-of-term exam score.

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

(M41630450)Fluid Power Engineering[Fluid Power Engineering]

Subject name[English]	Fluid Power Engineering[Fluid Power Engineering]				
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 Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	柳田　秀記 YANADA Hideki				
Numbering	MEC_MAS56025				

Objectives of class

加圧した流体(油，空気，水など)を利用して機械的な仕事を取り出すシステムであるフルードパワー機器・システムに関して，基礎的事項，機器を接続する管路内流体の動特性，フルードパワーに関する最近のトピックスについて講義する.

Fluid power systems utilize pressurized fluid (oil, air, water) to transfer power and output mechanical power through fluid power actuators. In this class, students acquire knowledge of structures and theories of fluid power components and systems as well as dynamics of fluid in pipelines. In addition, students acquire information on recent topics of fluid power engineering.

Contents of class

1週目:フルードパワーシステムの概要
2週目:各種機器の基礎理論
3週目:機器および回路の効率
4週目:管路の動特性(一次元波動方程式)
5周目:管路の動特性(一次元波動方程式の解，水撃現象)
6周目:管路の動特性(非定常層流，周波数応答)
7週目:フルードパワーに関する最近の話題
8週目:フルードパワーに関する最近の話題(45 分)，試験(45 分)

1st week:Introduction to fluid power systems
2nd week:Strutures and theories of fluid power componets
3rd week:Power loss and efficiencies of fluid power systems
4th week:Dynamics of fluid in pipeline (derivation of one-dimensional wave equation)
5th week:Dynamics of fluid in pipeline (solution of wace equation, water/oil hammer)
6th week:Dynamics of fluid in pipeline (unsteady laminar flow, frequency response)
7th week:Recent topics of fluid power systems
8th week:Recent topics of fluid power systems (45 min) and examination (45 min)

Self Preparation and Review

毎回の講義内容を復習するとともに，次回の内容についてテキスト等を参考に予習してくること。

Students are requested to review each class and prepare the next class by reading the prnted teaching material.

Related subjects

数学(複素関数，ラプラス変換)，流体力学
Fluid mechanics, Mathematics (complex variables, Laplace transform)

Notes for textbook

プリント配布

Printed teaching materials are given.

Reference1	**Book title**	Fluid Transients			**ISBN**	
	Author	Wylie/Streeter/Lisheng	**Publisher**	McGraw-Hill	**Publish year**	

Notes for reference

Goals to be achieved

1. フルードパワー機器の構造と特性について理解する.
2. フルードパワー機器・回路の出力や効率などが計算できる.
3. 1 次元の波動現象に対する理解を深める.

4. 水撃現象について理解する.
5. フルードパワーシステムにかかわる最近の話題について理解する.

1.To understand structures and characteristics of fluid power components
2.To be able to calculate output and efficiency of fluid power components and systems
3.To be able to derive basic equations of fluid in pipeline
4.To understand water/oil hammer
5.To understand recent topics of fluid power systems

Evaluation of achievement

レポート(50 点), 試験(50 点)の割合で成績を評価する.

評価点が 55 点以上の場合を合格(達成目標に到達した)とし, 得点によって達成の程度を以下のように明示する.
評価 A:80 点以上
評価 B:65～79 点
評価 C:55～64 点
Each student's achievement is evaulated by the sum of examination (50%) and reports (50%).
Students will be evaluated as follows:
A: Obtained total points of exam and reports, 80 or higher (out of 100 points).
B: Obtained total points of exam and reports, 65 or higher (out of 100 points).
C: Obtained total points of exam and reports, 55 or higher (out of 100 points).

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

電卓を必ず持参すること.
Each student has to take a calculator with him/her.

Other information

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

Reference URL

Office hours

e-mail にて相談時間を打ち合わせる.
The date and time are arranged by e-mail.

Relations to attainment objectives of learning and education

(C)工学的知識の獲得とその発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し, 発展的に活用できる能力

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

(M41630460)Advances in Systems, Control and Robotics[Advances in Systems, Control and Robotics]

Subject name[English]	Advances in Systems, Control and Robotics[Advances in Systems, Control and Robotics]				
Schedule number	M41630460	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2+Spring1	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	章 忠, 内山 直樹 SHO Tadashi, UCHIYAMA Naoki				
Numbering	MEC_MAS55025				

Objectives of class

To obtain advanced knowledge of time-frequency analysis and image processing by utilizing wavelet transform.

To learn fundamentals of mathematical programming that is typically employed for the management of industries and enterprises.

Contents of class

First half:
1. Basic theory of time-frequency analysis method will be briefly discussed.
1)Shot-Time Fourier transform
2)The Wigner-Ville Distribution
3)Hilbert Transform and instantaneous frequency analysis
4)Wavelet transform
2.Application of the wavelet Transform will be briefly discussed.
1) Time series signal analysis
2) Image processing
3) Abnormal detection
4) Surface inspection

Last half:
1st week: Fundamentals of mathematical programming
2nd week: Fundamentals of linear programming
3rd week: Simplex algorithm I
4th week: Simplex algorithm II
5th week: Fundamentals of nonlinear programming
6th week: Gradient method
7th week: Quadratic interpolation method
8th week: Summary and final examination

Self Preparation and Review

Required to prepare for and review each lecture contents based on handouts.

Related subjects

Basic knowledge of the signal analysis

Calculus and Linear algebra

Notes for textbook

Handouts will be perpared by lecturers.

Reference1	**Book title**	Frontiers in computing technologies for Manufacturing applications	**ISBN**	

	Author	Y. Shimizu , Z. Zhang, R. Batres	**Publisher**	Springer	**Publish year**	2007
Reference2	**Book title**	Wavelets and analysis			**ISBN**	
	Author	M. Holschneider	**Publisher**	Oxford University Press	**Publish year**	
Reference3	**Book title**	Time-Frequency Analysis			**ISBN**	
	Author	R.L. Allen, D.W. Mills	**Publisher**	IEEE Press	**Publish year**	
Reference4	**Book title**	Schaum's Outline of Operations Research 2nd Edition			**ISBN**	978-0070080201
	Author	Richard Bronson	**Publisher**	McGraw-Hill Education	**Publish year**	1997

Notes for reference

Goals to be achieved

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

Expected to understand fundamentals of mathematical programming.
Expected to understand the theory of the simplex method.
Expected to understand fundamentals of nonlinear programming.

Evaluation of achievement

First half: Interim report (50%) and term-end report (50%)

Last half:
The grade will be determined by the end-of-term examination score only (100 %).

The credit of this course is given if the score of the above examination is 55% or over.
Grade levels are C (55% - less than 65%), B (65 - less than 80%) and A (80% or over).

Examination

その他
Other

Details of examination

First half: Report

Last half: End-of-term examination

Other information

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

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

Reference URL

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

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

Wavelet transform, Time-frequency analysis, Mathematical Programming, Linear Programming, Nonlinear Programming

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop his/her research skill including the planning and the presentation.

Evaluation of achievement

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

Examination

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]				
Schedule number	M42610020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～1
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering	ELC_MAS51025				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop his/her research skill including the planning and the presentation.

Evaluation of achievement

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]				
Schedule number	M4261002T	**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)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering	ELC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.
To develop his/her research skill including the planning and the presentation.

Evaluation of achievement

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610040	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic 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 broad understanding of theoretical and experimental approoches related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1A[Seminar on Electrical and Electronic Information Engineering 1A]				
Schedule number	M42610050	**Subject area**	Advanced 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 Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic 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 broad understanding of theoretical and experimental approaches related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1B[Seminar on Electrical and Electronic Information Engineering 1B]				
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 Program for Master's Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic 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 broad understanding of theoretical and experimental approoches related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Methodology of R & D 1[Methodology of R & D 1]				
Schedule number	M42630100	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_MAS58025				

Objectives of class

The class aims to provide a basic understanding of R&D methodology related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

The class provides some fundamental tips to conduct R&D work effectively. Contents of the class depend on the supervisor. To be announced by individual supervisors

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To acquire the ability of identifying and formulating research problem, planning and implementing specific research tasks, troubleshooting and communicating outcomes.

Evaluation of achievement

Coursework and presentation are evaluated generally.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Material Science for Electronics 2[Material Science for Electronics 2]				
Schedule number	M42630130	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	福田　光男, 内田　裕久, 中村　雄一, 武藤　浩行 FUKUDA Mitsuo, UCHIDA Hironaga, NAKAMURA Yuichi, MUTO Hiroyuki				
Numbering	ELC_MAS52025				

Objectives of class

Objective of this subject is to learn about the forefront research and development on thermoelectronics and photonics in electronic materials, and and powder processing.

Objective of this subject is to learn about the forefront research and development on thermoelectronics and photonics in electronic materials, and and powder processing.

Contents of class

1. Photonics.
You will learn about photonic materials and devices.
1) photonic matreials and 2) (nano-) photonic devices.

2. Spin electronics
You will learn about materials and devices in the field of spin electronics.
1) magnetic materials, 2) magneto-optical devices, 3) giant magneto-resistance devices

3. Powder processing technologies
You will learn about powder processing techniques for electronic devices.
1) sintering, 2) micrstructute of ceramics and 3) nanocomposite

4. Thermoelectronics.
You will learn about advanced thermoelectronic materials and area from fundamentals to applications of thermoelectronics.
1) thermoelectronic materials, 2) Applications and processing of thermoelectronic materials, 3) Thermoelectronic devices and systems.

1. Photonics.
You will learn about photonic materials and devices.
1) photonic matreials and 2) (nano-) photonic devices.

2. Spin electronics
You will learn about materials and devices in the field of spin electronics.
1) magnetic materials, 2) magneto-optical devices, 3) giant magneto-resistance devices

3. Powder processing technologies
You will learn about powder processing techniques for electronic devices.
1) sintering, 2) micrstructute of ceramics and 3) nanocomposite

4. Thermoelectronics.
You will learn about advanced thermoelectronic materials and area from fundamentals to applications of thermoelectronics.
1) thermoelectronic materials, 2) Applications and processing of thermoelectronic materials, 3) Thermoelectronic devices and systems.

Self Preparation and Review

Related subjects

Notes for textbook

Lecture materials will be distributed.

Lecture materials will be distributed.

Notes for reference

Goals to be achieved

It aims at acquiring the broad knowledge of research and development by learning about the bases of recent research and development in various fields.

It aims at acquiring the broad knowledge of research and development by learning about the bases of recent research and development in various fields.

Evaluation of achievement

The reports or tests will be set in each categories.
The result is evaluated from the sum of those marks.
Grades: A:80-100, B:65-79, C:55-64.

The reports or tests will be set in each categories.
The result is evaluated from the sum of those marks.
Grades: A:80-100, B:65-79, C:55-64.

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Please make an appointment via e-mail.

Please make an appointment via e-mail.

Relations to attainment objectives of learning and education

Key words

photonics, spin electronics, powder processing, and thermelectronics

photonics, spin electronics, powder processing, and thermelectronics

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

Subject name[English]	Electrical Energy Systems 2[Electrical Energy Systems 2]				
Schedule number	M42630170	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	滝川 浩史, 櫻井 庸司, 穂積 直裕 TAKIKAWA Hirofumi, SAKURAI Yoji, HOZUMI Naohiro				
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. Lithium-ion Batteries
2. Post Lithium-ion Batteries
3. Recent Trend in Electrochemical Energy Storage Devices

Sub Course 3
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. Lithium-ion Batteries
2. Post Lithium-ion Batteries
3. Recent Trend in Electrochemical Energy Storage Devices

Sub Course 3
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-311, TEL: 0532-44-6727, E-mail: takikawa@ee.tut.jp
Office: C-311, TEL: 0532-44-6727, E-mail: takikawa@ee.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 Physics 2[Semiconductor Physics 2]				
Schedule number	M42630210	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	若原 昭浩, 岡田 浩, 河野 剛士 WAKAHARA Akihiro, OKADA Hiroshi, KAWANO Takeshi				
Numbering	ELC_MAS54025				

Objectives of class

先端的な半導体デバイスのための理論、デバイス構造、設計や作製プロセスを理解することを目標とする。
To understand semiconductor physics, structure, design, and processing of advanced semiconductor devices.

Contents of class

この科目は前半と後半の2つの部分から構成される。前半では pn 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。注入された少数キャリアのダイナミクスについても触れる。後半では学生が以下から1つのトピックスを選択する。

1. ナノ構造デバイスの作製および評価技術（岡田）
2. バンドエンジニアリングと量子効果デバイス（若原）
3. 先端 MEMS/NEMS 技術（河野）

講義に加えて学生が主体的に取り組むケーススタディも実施する。学生は与えられた課題についての調査研究や、要求を満足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。
This subject consists of two parts. The first half begins by introducing majority- and minority-carrier behavior in fundamental pn-junction and MOS structures. Injected minority carrier dynamics in semiconductors is also included. On the latter half, student choose one from following topics.

1. Fabrication and characterization technology for Nanosturecture devices (Prof. Okada)
2. Band engineering and quantum effect devices (Prof. Wakahara)
3. Advanced MEMS/NEMS technologies(Prof. Kawano)

Adding to lectures by professors, in this subject, a case study is also conducted. Namely, students are required to give a presentation on researches on the given topics, and on design of devices that satisfies required specifications.

Self Preparation and Review

Related subjects

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

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

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：C-303B　okada[at]ee.tut.ac.jp
河野剛士：C-603 kawano[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：C-303B　okada[at]ee.tut.ac.jp
Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp

Reference URL
http://www.int.ee.tut.ac.jp
http://www.eiiris.tut.ac.jp
http://www.int.ee.tut.ac.jp
http://www.eiiris.tut.ac.jp

Office hours

Relations to attainment objectives of learning and education

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 Electronic Information System 2[Advanced Electronic Information System 2]				
Schedule number	M42630270	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	市川 周一, 田村 昌也 ICHIKAWA Shuichi, TAMURA Masaya				
Numbering	ELC_MAS53025				

Objectives of class

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 communications.

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 communications.

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.

Week 1: LSI design and CAD
Week 2: Logic synthesis
Week 3: Layout
Week 4: Timing analysis
Week 5: Logic simulation
Week 6: Verification
Week 7: Test
Week 8: Examination

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

1. Transmission line
2. Waveguide and modes
3. Couplied line and directional coupler
4. Application of transmission line 1
5. Application of transmission line 2
6. Loaded, unloaded and external Q factors of resonator
7. Filter design
8. Examination

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(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

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Week 2: Logic synthesis
Week 3: Layout
Week 4: Timing analysis
Week 5: Logic simulation
Week 6: Verification
Week 7: Test
Week 8: Examination

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

1. Transmission line
2. Waveguide and modes
3. Couplied line and directional coupler
4. Application of transmission line 1
5. Application of transmission line 2
6. Loaded, unloaded and external Q factors of resonator
7. Filter design
8. Examination

Self Preparation and Review

Related subjects
Prerequisite (1): Fundamental knowledge and skills of logic design, algorithms, and computer structure.
Prerequisite (2): Fundamental Knowledge and skills of high-frequency circuit and electromagnetic engineering
Prerequisite (1): Fundamental knowledge and skills of logic design, algorithms, and computer structure.
Prerequisite (2): Fundamental Knowledge and skills of high-frequency circuit and electromagnetic engineering

Notes for textbook
No textbooks are assigned.
No textbooks are assigned.

Notes for reference

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 communications.
(1) To understand various CAD tools and the algorithms for CAD,
(2) To understand the role and design of microwave circuits used in wireless communications.

Evaluation of achievement
Item (1) 50%, Item (2) 50%.
Item (1) 50%, Item (2) 50%.

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

Details of examination
TBD
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

(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
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. 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
Key words (1) Logic design, algorithm (2) Microwave circuit, high-frequency circuit design, distributed constant circuit, Electromagnetic Engineering (1) Logic design, algorithm (2) Microwave circuit, high-frequency circuit design, distributed constant circuit, Electromagnetic Engineering

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

Subject name[English]	Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]				
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 Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員－2, S3系教務委員 3kei kyomu Iin-S2, 3kei kyomu Iin-S				
Numbering	CMP_MAS71015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

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

Contents of class

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

Self Preparation and Review

教員が指定する内容に関し、予習・復習を行う。

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.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。

(2)技術的な情報を扱う英文が解釈でき、作文できる。

(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提供ができる。

(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.

(2) To interpret technical information written in English, and to write such information in English.

(3) To make a standard construction of a technical paper.

(4) To provide information by oral presentation.

(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、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から総合的に指導教員が判定する。

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

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
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

Key words

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

Subject name[English]	Seminar on Computer Science and Engineering II[Seminar on Computer Science and Engineering II]				
Schedule number	M43610020	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員, S3系教務委員－23kei kyomu Iin-S, 3kei kyomu Iin-S2				
Numbering	CMP_MAS71015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

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

Contents of class

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

Self Preparation and Review

教員が指定する内容に関し、予習・復習を行う。

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

授業にて指定する。

Consult with your advisor.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。
(2)技術的な情報を扱う英文が解釈でき、作文できる。
(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提供ができる。
(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.
(2) To interpret technical information written in English, and to write such information in English.
(3) To make a standard construction of a technical paper.
(4) To provide information by oral presentation.
(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、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から総合的に指導教員が判定する。

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

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
Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M43610030	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員, S3系教務委員－23kei kyomu Iin-S, 3kei kyomu Iin-S2				
Numbering					

Objectives of class

The course is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.
It is also aimed for students to acquire, through thesis research, cooperativeness, a sense of responsibility, abilities for problem solving, research planning, decision making, outcome presentation and subject investigation, and to enhance their creativity and persistency, among others.

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.

Examination

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M43610030	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～1
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員，3系各教員，S3系教務委員－23kei kyomu Iin-S, 3kei kakukyouin, 3kei kyomu Iin-S2				
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.

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M4361003T	**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 for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員，3系各教員，S3系教務委員－23kei kyomu Iin-S, 3kei kakukyouin, 3kei kyomu Iin-S2				
Numbering	CMP_MAS61015				

Objectives of class

The course is intended for students to study basic materials in depth, related to his/her research subjects in computer science and engineering.
It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Computer Science and Engineering[Seminar on Computer Science and Engineering]				
Schedule number	M43610040	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員, S3系教務委員－23kei kyomu Iin-S, 3kei kyomu Iin-S2				
Numbering	CMP_MAS61015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

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

Contents of class

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

Self Preparation and Review

教員が指定する内容に関し、予習・復習を行う。

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.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。

(2)技術的な情報を扱う英文が解釈でき、作文できる。

(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提供ができる。

(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.

(2) To interpret technical information written in English, and to write such information in English.

(3) To make a standard construction of a technical paper.

(4) To provide information by oral presentation.

(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、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から総合的に指導教員が判定する。

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

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
Key words

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

Subject name[English]	Image Processing, Advanced[Image Processing, Advanced]				
Schedule number	M43630100	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	金澤 靖, 菅谷 保之 KANAZAWA Yasushi, SUGAYA Yasuyuki				
Numbering	CMP_MAS53225				

Objectives of class

This course involves fundamentals and advanced issues on image processing and computer vision.

This course involves fundamentals and advanced issues on image processing and computer vision.

Contents of class

[Kanazawa]
1: Introduction
2: Projective Geometry
3: Epipolar Geometry
4: 3-D Reconstruction from Two Views
5: Affine Projection
6: Uncalibrated Stereo
7: Structure from Motion
8: Experiments

[Sugaya]
9: Mathematical Introduction
10: Limits of Functions
11: Optimization of Functions
12: Least Squares
13: Advance of Least Squares
14: Non-linear Optimization
15: Maximum Likelihood

[Kanazawa]
1: Introduction
2: Projective Geometry
3: Epipolar Geometry
4: 3-D Reconstruction from Two Views
5: Affine Projection
6: Uncalibrated Stereo
7: Structure from Motion
8: Experiments

[Sugaya]
9: Mathematical Introduction
10: Limits of Functions
11: Optimization of Functions
12: Least Squares
13: Advance of Least Squares
14: Non-linear Optimization
15: Maximum Likelihood

Self Preparation and Review

The handouts are available via web page beforehand.

The handouts are available via web page beforehand.

Related subjects

Geometry, Linear Algebra, Statistics.

Geometry, Linear Algebra, Statistics.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

Reference1	**Book title**	Multiple View Geometry			**ISBN**	
	Author	R.I. Hartley and A. Zisserman	**Publisher**	Cambridge University Press	**Publish year**	2000
Reference2	**Book title**	Computer Vision -- A Modern Approach --			**ISBN**	
	Author	D.A. Forsyth and J. Ponce	**Publisher**	Prentice Hall	**Publish year**	2003
Reference3	**Book title**	Guide to 3D Vision Computation			**ISBN**	
	Author	K. Kanatani, Y. Sugaya, and Y. Kanazawa	**Publisher**	Springer	**Publish year**	2016

Notes for reference

Goals to be achieved

Understanding of the fundamentals and advanced issues on image processing and computer vision including:
- camera model,
- epipolar geometry,
- 3-D reconstruction from images,
- optimization

Understanding of the fundamentals and advanced issues on image processing and computer vision including:
- camera model,
- epipolar geometry,
- 3-D reconstruction from images,
- optimization

Evaluation of achievement

Grade will be determined by all submitted reports:
A: score >= 80
B: score >= 65
C: score >= 55

Grade will be determined by all submitted reports:
A: score >= 80
B: score >= 65
C: score >= 55

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 C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)

Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa)
Room C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)

Reference URL

http://www.img.cs.tut.ac.jp/
http://www.iim.cs.tut.ac.jp/

http://www.img.cs.tut.ac.jp/
http://www.iim.cs.tut.ac.jp/

Office hours

Relations to attainment objectives of learning and education

Key words

image processing, computer vision

image processing, computer vision

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

Subject name[English]	Networking, Advanced 1[Networking, Advanced 1]				
Schedule number	M43630240	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	梅村 恭司 UMEMURA Kyoji				
Numbering	CMP_MAS52325				

Objectives of class

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

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

Contents of class

1. Link Layer
2. Internet Protocol
3. Address Resolution Protocol
4. Internet Control Message Protocol
5. IP routing and Dynamic Routing Protocol
6. Transmission Control Protocol
7. User Datagram Protocol and Multicasting

1. Link Layer
2. Internet Protocol
3. Address Resolution Protocol
4. Internet Control Message Protocol
5. IP routing and Dynamic Routing Protocol
6. Transmission Control Protocol
7. User Datagram Protocol and Multicasting

Self Preparation and Review

Related subjects

The basic knowledge about the structure of client/server programs is required.

The basic knowledge about the structure of client/server programs is required.

Textbook1	**Book title**	TCP/IP Illustrated Volume. 1, The Protocols,			**ISBN**	
	Author	W. Richard Stevens	**Publisher**	Addison-wesley	**Publish year**	

Notes for textbook

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

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

Notes for reference

Goals to be achieved

The goal is to understand 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

Examination will be held in the last class.

Examination will be held in the last class.

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

C－304 umemura@tut.jp

C－304 umemura@tut.jp

Reference URL

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

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

Office hours

From 10:00AM to 13:00, Tue to Fri

(Appointment are strongly recommended)

From 10:00AM to 13:00, Tue to Fri

(Appointment are strongly recommended)

Relations to attainment objectives of learning and education

Key words

Computer Network, Distributed Systems

Computer Network, Distributed Systems

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

Subject name[English]	Networking, Advanced 2[Networking, 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 Engineering			**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.

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

From the 1st to 2rd week; Synchronization
From the 2nd to 3rd week; Consistency
From the 4nd to 5rd week; Fault tolerance
From the 6th to 7th week; Security
The 8th week; Examination or additional topics
From the 1st to 2rd week; Synchronization
From the 2nd to 3rd week; Consistency
From the 4nd to 5rd week; Fault tolerance
From the 6th to 7th week; Security
The 8th week; Examination or additional topics

Self Preparation and Review

It is strongly recommended to read over the reference book, "Distributed Systems: Principles and Paradigms (2nd Edition)" and to search keywords in the book on Internet to find practical examples.
It is strongly recommended to read over the reference book, "Distributed Systems: Principles and Paradigms (2nd Edition)" and to search keywords in the book on Internet to find practical examples.

Related subjects

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

Notes for textbook

Basically, materials referenced in the class are passed out in the class.
Basically, materials referenced in the class are passed out in the class.

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

Notes for reference

Related materials, such as books, videos, and web pages, are introduced in the class.
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;
(5) and some practical examples of distributed systems.

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;
(5) and some practical examples of distributed systems.

Evaluation of achievement

The achievement of students are evaluated mainly with a paper test or a report, while the score of quizzes held in the class and attendance ratio are taken into account.
A: 80 and over
B: 65 and over
C: 55 and over

The achievement of students are evaluated mainly with a paper test or a report, while the score of quizzes held in the class and attendance ratio are taken into account.
A: 80 and over
B: 65 and over
C: 55 and over

Examination

その他
Other

Details of examination

A paper examination is carried out in the last class OR a report related to distributed systems is assigned. These are selected according to the number of students.

A paper examination is carried out in the last class OR a report related to distributed systems is assigned. These are selected according to the number of students.

Other information

Teacher's Room: C-509
Internal Phone Number: 6750
E-mail: ren@tut.jp

Teacher's Room: C-509
Internal Phone Number: 6750
E-mail: ren@tut.jp

Reference URL

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

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.

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

Key words

Distributed System, Computer Network, Operating System

Distributed System, Computer Network, Operating System

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

Subject name[English]	Advanced Robotics and Informatics 1[Advanced Robotics and Informatics 1]				
Schedule number	M43630260	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	三浦 純 MIURA Jun				
Numbering	CMP_MAS53225				

Objectives of class

Fundamental and advanced issues in intelligent robotics will be discussed. Topics included are probabilistic sensor fusion techniques (e.g., Kalman filter and particle filter) and its application to mobile robot localization and mapping.

Contents of class

Week 1: Introduction to scene recognition and sensor fusion.
Week 2: Probability basic and Bayes filter.
Week 3: Kalman filter and its extensions.
Week 4: Nonparametric filters.
Week 5: Mobile robot localization.
Week 6: Mobile robot mapping.
Week 7: SLAM (Simultaneous Localization and Mapping).
Week 8: Presentations of students' reports and conclusions.

Self Preparation and Review

Related subjects

Fundamental knowledge of linear algebra and probability theory is useful.

Notes for textbook

Handouts will be prepared. The main reference is shown below.

Reference1	**Book title**	Probabilistic Robotics			**ISBN**	978-0262201629
	Author	S. Thrun, W. Burgard, D. Fox	**Publisher**	The MIT Press	**Publish year**	2005

Notes for reference

Goals to be achieved

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Evaluation of achievement

Grade will be determined by final presentation and report.

Examination

レポートで実施
By Report

Details of examination

Other information

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

Reference URL

http://www.aisl.cs.tut.ac.jp/classes/robotics-and-informatics/

ID and password will be given at the class.

Office hours

Make an appointment beforehand by email.

Relations to attainment objectives of learning and education

Key words

Robotics

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

Subject name[English]	Advanced Robotics and Informatics 2[Advanced Robotics and Informatics 2]				
Schedule number	M43630270	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	岡田 美智男 OKADA Michio				
Numbering	CMP_MAS53225				

Objectives of class

認知的なロボティクスの歴史的背景，状況的な認知とロボットの身体性，社会的相互行為，社会的なロボットの社会実装などについて学ぶ．

Fundamental and advanced issues on social robotics will be discussed such as historical background of cognitive robotics, embodied cognition, organizing social interaction and applications of social robots.

Contents of class

講義内容は次の通りとする．
- Historical background of cognitive robotics
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Organizing social interaction in social robots
- Socially assistive robotics
- Presentation and discussion

- Historical background of cognitive robotics
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Organizing social interaction in social robots
- Socially assistive robotics
- Presentation and discussion

Self Preparation and Review

あらかじめ予習のための参考文献を提示します．
References on the class will be prepared.

Related subjects

Fundamentals of cognitive science.
Fundamentals of cognitive science.

Notes for textbook

ハンドアウトを用意します．

Handouts will be prepared.

Reference1	**Book title**	Understanding Intelligence			**ISBN**	
	Author	R. Pfeifer, C. Scheier	**Publisher**	MIT Press	**Publish year**	2001

Notes for reference

Goals to be achieved

社会的なロボットに関する基本的事項を理解することを達成目標とする.

- Historical background of cognitive robotics
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Organizing social interaction in social robots
- Socially assistive robotics

Understanding of the fundamentals of social robotics including:
- Historical background of cognitive robotics
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Organizing social interaction in social robots
- Socially assistive robotics

Evaluation of achievement

プレゼンテーションと最終レポートの内容で評価する.

Grade will be determined by the presentations in the class and final report.

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

http://www.icd.cs.tut.ac.jp/en/profile.html

Office hours

火曜日, 14:30-16:00

Tuesday, 14:30-16:00

Relations to attainment objectives of learning and education

情報・知能工学専攻

(D)広範囲の知識を有機的に連携させた研究開発方法論の体得

広範囲の知識の連携による研究開発に対する方法論を体得し, 研究開発の計画立案と, それを実践できる能力

(E)国内外において活躍できる表現力・コミュニケーション力

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し, コミュニケーションする能力とプレゼンテーションする能力

Key words

社会的ロボティクス, 認知ロボティクス, 社会的相互行為

Social Robotics, Cognitive Robotics, Social Interaction

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

Subject name[English]	Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics 1]				
Schedule number	M43630300	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	村越 一支 MURAKOSHI Kazushi				
Numbering	CMP_MAS53125				

Objectives of class

The aim of this class is to understand complex and intelligent systems.
To achieve the aim, this class offers knowledge and skills for mathematical modeling and simulation methods.

Contents of class

A. Introduction
What is complex and intelligent systems? Outline of the brain system.
B. Computational Neuroscience and Application-oriented Mathematical Models
What is computational Neuroscience and artificial neural networks?
C. Model Neurons
Structure of neurons, synapse, model neurons.
D. Learning at connected part of neurons (synapse)
Synaptic plasticity, spike-timing-dependent plasticity (STDP).
E. Simulation Methods
Numerical calculation methods for single neuron, neural network from single neuron.
F. Simulation Environments
Explanation and demonstration of simulation environments such as NEURON and GENESIS.
G. Self-organizing
What is self-organizing? Winner Takes All, Self-organizing map (SOM)
H. Reinforcement Learning
What is reinforcement learning, reinforcement learning in the brain, demonstration of reinforcement learning for controlling robot
I. Summary

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

Self Preparation and Review

Related subjects

Notes for textbook

Handouts are distributed.

Notes for reference

Goals to be achieved

- Know complex and intelligent mathematical models, and understand them at the degree which you can simulte them by your programming or by using simulation environment.
- Can explain technical terms of complex and intelligent mathematical models.
- Master numerical calculation methods that are used in complex and intelligent mathematical models.

Evaluation of achievement

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

Examination

その他

Other

Details of examination

Other information

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

Reference URL

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

Office hours

After this class

Relations to attainment objectives of learning and education

(D)広範囲の知識を有機的に連携させた研究開発方法論の体得
広範囲の知識の連携による研究開発に対する方法論を体得し，研究開発の計画立案と，それを実践できる能力

Key words

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

Subject name[English]	Complex Systems and Intelligent Informatics 2[Complex Systems and Intelligent Informatics 2]				
Schedule number	M43630310	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	石田　好輝 ISHIDA Yoshiteru				
Numbering	CMP_MAS53125				

Objectives of class

This course provides opportunities to learn the followings:
* Modeling and analysis on complex systems and learning systems,
* System theoretic analysis on complex systems and learning systems ,
* Computer simulations and implications, and
* Implementation of complex systems and learning systems.

Recent topics on complex systems and learning systems will be also discussed in the course.

Contents of class

1. Introduction on complex dynamical systems
2. Dynamical systems
3. Complex networks and interactions
4. Cellular automata and neural networks
5. Information Processing by complex systems
6. Emergence of cooperation in autonomous agents
7. Learning algorithms for agents
8. Evolutionary algorithms for agents
9. Biological systems and information processing

Self Preparation and Review

Related subjects

Notes for textbook

No textbook. References other than below will be suggested at the first class.
Ishida, Y.: Self-Repair Networks, Springer (2015);
Ishida, Y.: Immunity-Based Systems, Springer (2004);
Barabasi, A.L.: Linked, Perseus, (2002)
Strogatz, S. H. Sync, Hyperion (2003)

Notes for reference

Goals to be achieved

Evaluation of achievement

Class performance (50%) and term-end report (50%)

Examination

その他
Other

Details of examination

Other information

Room F-504, Ext. 6895

Reference URL

Office hours

Wednesday 16:30–17:00

Relations to attainment objectives of learning and education

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，自然と人間との共生，人類の幸福・健康・福祉について考える能力
(C)理論的・応用的知識の獲得と発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し，発展的に活用できる能力
(D)広範囲の知識を有機的に連携させた研究開発方法論の体得
広範囲の知識の連携による研究開発に対する方法論を体得し，研究開発の計画立案と，それを実践できる能力
(E)国内外において活躍できる表現力・コミュニケーション力
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し，コミュニケーションする能力とプレゼンテーションする能力

Key words

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

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

Subject name[English]	Seminar on Environmental and Life Science I[Seminar on Environmental and Life Science I]				
Schedule number	M44610010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS55015				

Objectives of class

This course will provide the students with opportunities to study on his/her research subjects on environmental and life sciences by reading textbooks and scientific papers under the guidance of his/her supervisor. The aim of the lessen for the students is to learn knowledge and presentation skills required for his/her research in the seminar as well as to deepen his/her understanding of environmental and life sciences.

Contents of class

The students will be required to read textbooks and papers written by other language than Japanese, especially English, which are suggested by his/her supervisor, and to report and discuss deeply on his/her research subject in the seminar.

Self Preparation and Review

Related subjects

Seminar on Environmental and Life Science II
Thesis Research on Environmental and Life Science
All other relevant subjects in Advanced Environmental and Life Sciences

Notes for textbook

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

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences
To understand the contents of scientific papers in a given field of environmental and life sciences
To be able to make oral and poster presentations relevant to papers he/she has read.

Evaluation of achievement

The evaluation is based on the scores of reading textbooks and scientific papers, discussions, reports and presentations of his/her research in the seminar. His/her supervisor evaluates the scores.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Seminar on Environmental and Life Science II[Seminar on Environmental and Life Science II]				
Schedule number	M44610020	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS65015				

Objectives of class

Based on the Seminar on Environmental and Life Science I, this course will further provide the students with the opportunity to study on his/her research subject in environmental and life sciences by reading textbooks and papers under the guidance of his/her supervisor. The students will learn the knowledge and the presentation skills required for his/her research in the seminar.

Contents of class

The students will be required to read textbooks and papers written by other language than Japanese, especially English, which are suggested by his/her supervisor, and to report and discuss deeply on his/her research subject in the seminar.

Self Preparation and Review

Related subjects

Seminar on Environmental and Life Science I
Thesis Research on Environmental and Life Science
All other relevant subjects in Advanced Environmental and Life Sciences

Notes for textbook

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

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences
To understand the contents of scientific papers in a given field of environmental and life sciences
To be able to make oral and poster presentations relevant to papers he/she has read.

Evaluation of achievement

The evaluation is based on the scores of reading textbooks and scientific papers, discussions, reports and presentations of his/her research in the seminar. His/her supervisor evaluates the scores.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

None during exam period

Details of examination

Other information

Supervisor

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]				
Schedule number	M44610030	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～1
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 4系各教員 4kei kyomu Iin-S, 4kei kakukyouin				
Numbering	ENV_MAS68015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]				
Schedule number	M4461003T	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 4系各教員 4kei kyomu Iin-S, 4kei kakukyouin				
Numbering	ENV_MAS68015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Seminar on Environmental and Life Science[Seminar on Environmental and Life Science]				
Schedule number	M44610040	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS65015				

Objectives of class

This course will provide the students with the opportunity to study on his/her research subject in environmental and life sciences by reading textbooks and papers under the guidance of his/her supervisor. The students will learn the knowledge and the presentation skills required for his/her research in the seminar.

Contents of class

The students will be expected to read textbooks and papers written by foreign language that are indicated by his/her supervisor, and report and discuss deeply on his/her research subject in the seminar.

Self Preparation and Review

Related subjects

Thesis Research on Environmental and Life Science
All other relevant subjects in Advanced Environmental and Life Sciences

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire basic knowledge on environmental and life sciences
To understand the contents of scientific papers in a given field of environmental and life sciences
To be able to make oral and poster presentations relevant to papers he/she has read.

Evaluation of achievement

The evaluation is based on the scores of reading papers, discussions, reports and presentations of his/her research in the seminar. His/her supervisor evaluates the scores.

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

(M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	Advanced Polymer Chemistry[Advanced Polymer Chemistry]				
Schedule number	M44630070	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	伊津野 真一, 原口 直樹 ITSUNO Shinichi, HARAGUCHI Naoki				
Numbering	ENV_MAS52225				

Objectives of class

This course focuses on the synthetic aspects of polymer-supported chemistry. Several applications of solid-supported organic chemistry will be discussed.

Contents of class

(1) Preparation of functionalized monomers
(2) Preparation method of polymer-support
(3) Preparation of functional polymers by polymer reaction method
(4) Preparation of functional polymers by polymerization method
(5) Nucleophilic reactions on the functional polymer
(6) Electrophhilic reactions on the functional polymers
(7) Polymer-supported reagents
(8) Polymer-supported catalysts
(9) Asymmetric reaction using polymer-supported catalyst
(10) Solid phase peptide synthesis

Self Preparation and Review

Related subjects

Organic Chemistry
Polymer chemistry

Notes for textbook

No textbook will be used.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

The report on selected topics will be imposed.

Examination

レポートで実施
By Report

Details of examination

Other information

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

B-403

6812
haraguchi@ens.tut.ac.jp

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

Office hours
Any time

Relations to attainment objectives of learning and education

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

(M44630080)Advanced Polymer Engineering[Advanced Polymer Engineering]

Subject name[English]	Advanced Polymer Engineering[Advanced Polymer Engineering]				
Schedule number	M44630080	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	吉田 絵里 YOSHIDA Eri				
Numbering	ENV_MAS52215				

Objectives of class

1. To acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical carbon dioxide.
2. To understand molecular self-assembly in vivo and in vitro.

Contents of class

1. Advanced polymer syntheses
1) Controlled radical polymerization 1
2) Controlled radical polymerization 2
3) Molecular design through living radical polymerization
4) Heterogeneous polymerizations
5) Polymerization in supercritical carbon dioxide

2. Molecular self-assembly
1) Theory of molecular self-assembly in vitro
2) Theory of molecular self-assembly in vivo
3) Supramolecular chemistry

Self Preparation and Review

Related subjects

Notes for textbook

No textbook is needed.

Notes for reference

Goals to be achieved

To understand cutting-edge technology based on well-defined polymers.

Evaluation of achievement

Report submission each time

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Available at anytime

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Advanced Molecular Life Science[Advanced Molecular Life Science]				
Schedule number	M44630120	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	田中 照通, 梅影 創 TANAKA Terumichi, UMEKAGE So				
Numbering	ENV_MAS53225				

Objectives of class

This course will provide students with the opportunity to read recent important research papers on RNA engineering. Therefore, the knowledge of basic biotechnology, biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are NOT qualified for this course. The students will make the presentation of two or three research papers.

This course will provide students with the opportunity to read recent important research papers on RNA engineering. Therefore, the knowledge of basic biotechnology, biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are NOT qualified for this course. The students will make the presentation of two or three research papers.

Contents of class

No Lecture.
This Class goes with the "Original Papers" of the recent RNA engineering published in the Nucleic Acids Research. At first, students must access the HP of Nucleic Acids Research: http://nar.oxfordjournals.org/.
Next, pick two or more good research papers published after 2015 in the Nucleic Acids Research.
After that, every student will give a presentation of the chosen paper. Students will be given 20 min for the presentation. In that duration, the student must explain plainly, but throughout the novelty of the research.

No Lecture.
This Class goes with the "Original Papers" of the recent RNA engineering published in the Nucleic Acids Research. At first, students must access the HP of Nucleic Acids Research: http://nar.oxfordjournals.org/.
Next, pick two or more good research papers published after 2015 in the Nucleic Acids Research.
After that, every student will give a presentation of the chosen paper. Students will be given 20 min for the presentation. In that duration, the student must explain plainly, but throughout the novelty of the research.

Self Preparation and Review

A detailed course outline will be handed out on the first day.

A detailed course outline will be handed out on the first day.

Related subjects

Biotechnology, molecular biology

Biotechnology, molecular biology

Notes for textbook

Notes for reference

Goals to be achieved

At the end of the course, participants are expected to explain the recent progress of RNA engineering.

At the end of the course, participants are expected to explain the recent progress of RNA engineering.

Evaluation of achievement

Attendance and attitude (20%)
Presentation (80%)

Attendance and attitude (20%)
Presentation (80%)

Examination

その他
Other

Details of examination
Other information So Umekage: ex.6917, umekage@ens.tut.ac.jp, G-402 So Umekage: ex.6917, umekage@ens.tut.ac.jp, G-402
Reference URL
Office hours Please make an appointment. Please make an appointment.
Relations to attainment objectives of learning and education (C)理論的・応用的知識の獲得と発展的活用能力 重要な学術・技術分野の理論・応用知識を自発的に獲得し，発展的に活用できる能力
Key words RNA, biotechnology, molecular biology RNA, biotechnology, molecular biology

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

Subject name[English]	Advanced Life Science and Biotechnology I[Advanced Life Science and Biotechnology I]				
Schedule number	M44630210	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS53225				

Objectives of class

This course will provide the students with the opportunity to study on selected subjects in the realm of advanced life science and biotechnology.

Contents of class

The classes will be given by his/her supervisor. The students will be required to read textbooks and papers but the type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Advanced Life Science and Biotechnology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on life science and biotechnology
To be able to report and discuss the contents of textbooks and papers he/she has read.

Evaluation of achievement

The evaluation is based on the scores of reports, presentations, and examination.

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advanced Environmental Technology I[Advanced Environmental Technology I]				
Schedule number	M44630230	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS54225				

Objectives of class

This course will provide the students with the opportunity to study on the selected subject in the realm of advanced environmental science and technology.

Contents of class

The classes will be given by his/her supervisor. The students will be required to read textbooks and papers but the type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Advanced Environmental Technology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on environmental science and technology
To be able to report and discuss the contents of textbooks and papers he/she has read.

Evaluation of achievement

The evaluation is based on the scores of reports, presentations, and examination.

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advanced Environmental and Ecological Systems I[Advanced Environmental and Ecological Systems I]				
Schedule number	M44630250	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS54125				

Objectives of class
This course will provide the students with the opportunity to study on the selected subject in the realm of advanced environmental and ecological systems.

Contents of class
The classes will be given by his/her supervisor. The students will be required to read textbooks and papers but the type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Notes for textbook
Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved
To acquire advanced knowledge on environmental science and technology and ecological systems
To be able to report and discuss the contents of textbook and papers he/she has read.

Evaluation of achievement
The evaluation is based on the scores of reports, presentations, and examination.

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

Office hours
Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

(M44630300)Applied Environmental Biology[Applied Environmental Biology]

Subject name[English]	Applied Environmental Biology[Applied Environmental Biology]				
Schedule number	M44630300	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	中鉢 淳 NAKABACHI Atsushi				
Numbering	ENV_MAS52225				

Objectives of class

The aim of this course is to learn concepts of what life is, and how we can use the knowledge of biology in environmental/agricultural sciences.

The aim of this course is to learn concepts of what life is, and how we can use the knowledge of biology in environmental/agricultural sciences.

Contents of class

1st week：Biodiversity and evolution
2nd week：Prokaryotic genomes
3rd week：Eukaryotic genomes
4th week：Plant−microbe interactions
5th week：Agricultural pests and diseases
6th week：Integrated pest management
7th week：Genetically modified crops
8th week：Summary

1st week：Biodiversity and evolution
2nd week：Prokaryotic genomes
3rd week：Eukaryotic genomes
4th week：Plant−microbe interactions
5th week：Agricultural pests and diseases
6th week：Integrated pest management
7th week：Genetically modified crops
8th week：Summary

Self Preparation and Review

No preparation is required, but after class review of handouts is highly recommended.
No preparation is required, but after class review of handouts is highly recommended.

Related subjects

Notes for textbook

No textbooks are required.
No textbooks are required.

Reference1	**Book title**	Molecular Biology of the Cell			**ISBN**	978−0815344643
	Author	Bruce Alberts et al.	**Publisher**	Garland Science	**Publish year**	2014
Reference2	**Book title**	Evolution			**ISBN**	978−0879696849
	Author	Nicholas H.	**Publisher**	Cold Spring	**Publish**	2007

		Barton et al.		Harbor Laboratory Press	**year**	
Reference3	**Book title**	Plant Physiology			**ISBN**	978-0878935659
	Author	Lincoln Taiz, Eduardo Zeiger	**Publisher**	Sinauer Associates Inc.	**Publish year**	2010

Notes for reference

Goals to be achieved

(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.

(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.
Grade: Score range
A: 80-100
B: 65-79
C: 55-64
D: 0-54
Achievements are evaluated by essays/term papers.
Grade: Score range
A: 80-100
B: 65-79
C: 55-64
D: 0-54

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Emails are welcome.
Emails are welcome.

Relations to attainment objectives of learning and education

Key words

evolution, biodiversity, genomes, biological interactions, agriculture
evolution, biodiversity, genomes, biological interactions, agriculture

(M44630350)Environmental Fluid Dynamics[Environmental Fluid Dynamics]

Subject name[English]	Environmental Fluid Dynamics[Environmental Fluid Dynamics]				
Schedule number	M44630350	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Mon.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	東海林 孝幸 TOKAIRIN Takayuki				
Numbering	ENV_MAS54225				

Objectives of class

This course mainly focus on environmental fluid such as the Earth's atmosphere. The aim of the course is to understand how the motion of atmosphere can be expressed by basic physics laws (conservation laws, thermodynamics of fluid).

This course mainly focus on environmental fluid such as the Earth's atmosphere. The aim of the course is to understand how the motion of atmosphere can be expressed by basic physics laws (conservation laws, thermodynamics of fluid).

Contents of class

1st: Introduction
2nd: Basic conservation laws (1)
3rd: Basic conservation laws (2)
4th: Thermodynamics of atmosphere
5th: Circulation and vorticity equation
6th: Energy equation
7th: Hamiltonian system in continuum mechanics
8th: Conclusion

1st: Introduction
2nd: Basic conservation laws (1)
3rd: Basic conservation laws (2)
4th: Thermodynamics of atmosphere
5th: Circulation and vorticity equation
6th: Energy equation
7th: Hamiltonian system in continuum mechanics
8th: Conclusion

Self Preparation and Review

Related subjects

Math (differential equation, vector analysis etc), physics (mechanics, fluid mechanics)

Math (differential equation, vector analysis etc), physics (mechanics, fluid mechanics)

Notes for textbook

The lecturer distributes handouts.

The lecturer distributes handouts.

Notes for reference

Goals to be achieved

This course aims to understand the Earth's atmospheric motion using fundamental fluid dynamics. We will mainly focus on:
・the conservation laws of mass, momentum and energy for atmosphere.
・thermodynamics of atmosphere
・circulation, vorticity equation

This course aims to understand the Earth's atmospheric motion using fundamental fluid dynamics. We will mainly focus on:
・the conservation laws of mass, momentum and energy for atmosphere.
・thermodynamics of atmosphere
・circulation, vorticity equation

Evaluation of achievement

Students who attend all classes will be evaluated as follows:
A: Achieved all goals and obtained total points of reports, 80 or higher (out of 100 points).

B: Achieved 65% of goals and obtained total points of reports, 65 or higher (out of 100 points).
C: Achieved 55% of goals and obtained total points of reports, 55 or higher (out of 100 points).
Students who attend all classes will be evaluated as follows:
A: Achieved all goals and obtained total points of reports, 80 or higher (out of 100 points).
B: Achieved 65% of goals and obtained total points of reports, 65 or higher (out of 100 points).
C: Achieved 55% of goals and obtained total points of reports, 55 or higher (out of 100 points).

Examination

レポートで実施
By Report

Details of examination

Report
Report

Other information

Room #G-405, tokairin@ens.tut.ac.jp
Room #G-405, tokairin@ens.tut.ac.jp

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]				
Schedule number	M45610010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

All the students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled 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

Report

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その他

Other

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering II[Seminar on Architecture and Civil Engineering II]				
Schedule number	M45610020	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

All the students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled 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

Report

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その他

Other

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis 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 Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

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

Contents of class

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

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 preparation and presentation of the thesis.

Examination

その他

By Report

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis 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 Program for Master's Degree			**Subject grade**	1～1
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering	ARC_MAS51025				

Objectives of class

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

Contents of class

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

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 preparation and presentation of the thesis.

Examination

その他

Other

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]				
Schedule number	M4561003T	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering	ARC_MAS51025				

Objectives of class

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

Contents of class

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

Self Preparation and Review

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 preparation and presentation 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 laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]				
Schedule number	M45610040	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

All the students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled program of the seminars is announced by the supervisor at the guidance of the seminar.

Contents of class

In each seminar, students pursue several research topics and/or undertake projects collectively and solely under the instruction of the faculty members of the department and/or those of other departments.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630010)Elasticity and Stability[Elasticity and Stability]

Subject name[English]	Elasticity and Stability[Elasticity and Stability]				
Schedule number	M45630010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	松本　幸大 MATSUMOTO Yukihiro				
Numbering	ARC_MAS54325				

Objectives of class

This lecture is concerned with the static continuum mechanics of elastic 2-dimensional bodies. The primary purpose is to encourage students to gain the fundamental concept and to raise their potential abilities for advanced and practical applications in the future.

This lecture is concerned with the static continuum mechanics of elastic 2-dimensional bodies. The primary purpose is to encourage students to gain the fundamental concept and to raise their potential abilities for advanced and practical applications in the future.

Contents of class

1st - 6th week; Mechanics of elasticity
Tensor Analysis in Cartesian Coordinates
Stresses and Equilibrium
Strain-Displacement Relations
Constitutive Equations in Isotropic Elastic Materials
7th - 11th week; Mechanics of elasticity for composite material
Orthotropic material
Mixturing rule
Laminate theory
12th - 15th week;　Elastic buckling of bars and plates

1st - 6th week; Mechanics of elasticity
Tensor Analysis in Cartesian Coordinates
Stresses and Equilibrium
Strain-Displacement Relations
Constitutive Equations in Isotropic Elastic Materials
7th - 11th week; Mechanics of elasticity for composite material
Orthotropic material
Mixturing rule
Laminate theory
12th - 15th week;　Elastic buckling of bars and plates

Self Preparation and Review

Related subjects

Notes for textbook

Some handouts will be distributed.

Some handouts will be distributed.

Reference1	**Book title**	Theory of plates and shells			**ISBN**	978-0070858206
	Author	S. Timoshenko	**Publisher**	McGraw-Hill Publishing Company	**Publish year**	1964

Reference2	**Book title**	Theory of Elastic Stability			**ISBN**	978-0486472072
	Author	S. Timoshenko	**Publisher**	Dover Publications	**Publish year**	2009
Reference3	**Book title**	Mechanics of Composite Materials			**ISBN**	978-0486442396
	Author	Richard M. Christensen	**Publisher**	Dover Publications	**Publish year**	2005

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Based on reports

Based on reports

Examination

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By Report

Details of examination

Other information

Reference URL

http://www.st.ace.tut.ac.jp/

http://sel.ace.tut.ac.jp/y-matsum/

http://www.st.ace.tut.ac.jp/

http://sel.ace.tut.ac.jp/y-matsum/

Office hours

Please contact by email.

Please contact by email.

Relations to attainment objectives of learning and education

Key words

(M45630090)Coastal Hydraulics[Coastal Hydraulics]

Subject name[English]	Coastal Hydraulics[Coastal Hydraulics]				
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**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	加藤 茂 KATO Shigeru				
Numbering	ARC_MAS54325				

Objectives of class

To understand the basic concept of coastal engineering and the advanced knowledge of coastal process, design and protection including numerical calculation.

To understand the basic concept of coastal engineering and the advanced knowledge of coastal process, design and protection including numerical calculation.

Contents of class

・Introduction of Coastal Engineering
water waves, wave theories, tides and water levels, wave breaking, etc.
・Shore Processes
near-shore current, coastal material, beach property, sediment transport, etc.
・Coastal Design
design process, model classification, physical & numerical models, etc.
・Computation of Coastal Morphology
sediment transport rate, analytical computation, numerical solutions, etc.

・Introduction of Coastal Engineering
water waves, wave theories, tides and water levels, wave breaking, etc.
・Shore Processes
near-shore current, coastal material, beach property, sediment transport, etc.
・Coastal Design
design process, model classification, physical & numerical models, etc.
・Computation of Coastal Morphology
sediment transport rate, analytical computation, numerical solutions, etc.

Self Preparation and Review

Self preparation before the class and review after the class are necessary using the distributed handout and/or some references.

Self preparation before the class and review after the class are necessary using the distributed handout and/or some references.

Related subjects

Basic knowledge of coastal engineering is desirable.

Basic knowledge of coastal engineering is desirable.

Notes for textbook

No textbook is required for this class. Lecture handout will be distributed.

No textbook is required for this class. Lecture handout will be distributed.

Reference1	**Book title**	Water Wave Mechanics for Engineers and Scientists – Advanced Series on Ocean Engineering – Vol. 2			**ISBN**	
	Author	Robert G. Dean & Robert A Dalrymple	**Publisher**	World Scientific	**Publish year**	
Reference2	**Book title**	Introduction to Coastal Engineering and Management –			**ISBN**	

		Advanced Series on OceanEngineering – Vol. 16				
	Author	J. William Kamphuis	**Publisher**	World Scientific	**Publish year**	
Reference3	**Book title**	Basic Coastal Engineering			**ISBN**	
	Author	Robert M. Sorensen	**Publisher**	Kluwer Academic Publishers	**Publish year**	

Notes for reference

Goals to be achieved

Understanding the concept and methodology for coastal engineering.

Understanding the concept and methodology for coastal engineering.

Evaluation of achievement

Reports & attendance

Reports(70%) & attendance(30%)

Students are required to attend essentially all classes, and to submit all assignments for evaluation.

More than four classes of absence are not allowed for evaluation.

Evaluation is based on total points (out of 100 points) of reports (70%) and class attendance (30%).

Grade, A: 80 or higher, B: 65 or higher to lower than 80, C: 55 or higher to lower than 65.

Examination

レポートで実施

By Report

Details of examination

Other information

Room : D-812

E-mail : s-kato@ace.tut.ac.jp.

Room : D-812

E-mail : s-kato@ace.tut.ac.jp.

Reference URL

N/A

N/A

Office hours

At any time.

But please ask me the visit time in advance.

At any time.

But please ask me the visit time in advance.

Relations to attainment objectives of learning and education

N/A

N/A

Key words

Sediment transport, Current, Waves, Shore protection and management

Sediment transport, Current, Waves, Shore protection and management

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

Subject name[English]	Advanced Structural System Planning and Design I[Advanced Structural System Planning and Design I]				
Schedule number	M45630190	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled 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

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Environmental System Planning and Design I[Advanced Environmental System Planning and Design I]				
Schedule number	M45630210	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled 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

Key words

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

Subject name[English]	Advanced Regional System Planning and Design I[Advanced Regional System Planning and Design I]				
Schedule number	M45630230	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51025				

Objectives of class

It depends on the laboratory. The resistered students are required to attend all the seminars, which is arranged by the laboratory supervisor for the special study subjects related to the current research activity of the laboratory. The scheduled 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

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seismic Design of Structures[Seismic Design of Structures]				
Schedule number	M45630290	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Wed.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	齊藤　大樹 SAITOH Taiki				
Numbering	ARC_MAS51025				

Objectives of class

The objective of this class is to learn the evaluation method of structural performance of the building based on dynamic behavior and ultimate strength and deformation capacity.

The objective of this class is to learn the evaluation method of structural performance of the building based on dynamic behavior and ultimate strength and deformation capacity.

Contents of class

1. Basic concept of seismic design of building
2. Force-deformation characteristics of building materials
3. Seismic evaluation method for existing buildings
3-1. Screening method 1
3-2. Screening method 2
4. Post-seismic quick risk assessment of damaged building

1. Basic concept of seismic design of building
2. Force-deformation characteristics of building materials
3. Seismic evaluation method for existing buildings
3-1. Screening method 1
3-2. Screening method 2
4. Post-seismic quick risk assessment of damaged building

Self Preparation and Review

Related subjects

None

None

Notes for textbook

Notes for reference

Goals to be achieved

To understand structural design through learning the seismic evaluation method of structural member and building.

To understand structural design through learning the seismic evaluation method of structural member and building.

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

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Reference URL

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

Office hours

Please contact by e-mail to make an appointment.
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Relations to attainment objectives of learning and education

Key words