Syllabus

International Master′s Degree Program

（2013-Spring Term）

(M40030010)Management Science[Management Science]

Subject name[English]	Management Science[Management Science]				
Schedule number	M40030010	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Fri.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	宮田 譲, 藤原 孝男 MIYATA Yuzuru, FUJIWARA Takao				
Numbering					

Objectives of class

In Management Science 1, the class objective is to learn the introductory finance on the firm value and capital cost from the management point of view.

In Management Science 2, the lecture will focus on the statistical methodology frequently applied in management science. In particular, multivariate analysis will be emphasized in the lecture.
In addition, this subject is lectured in English for foreign students in English course.
In Management Science 1, the class objective is to learn the introductory finance on the firm value and capital cost from the management point of view.

In Management Science 2, the lecture will focus on the statistical methodology frequently applied in management science. In particular, multivariate analysis will be emphasized in the lecture.
In addition, this subject is lectured in English for foreign students in English course.

Contents of class

In Management Science 1, the class content will be explained about the fundamental ideas of pricing options in financial derivatives, based on the basic probability, normal random variables, geometric Brownian motion, interest rate, arbitrage, Black-Scholes formula, valuing by expected utility, exotic options, and so on.
8th week will be examination.

In Management Science 2, the lecture includes mathematical expression of multivariate statistical data, multivariate regression analysis, principal component analysis, and so on.

The handout will be distributed to students. Students must learn the contents of the handout before and after each lecture.

In Management Science 1, the class content will be explained about the fundamental ideas of pricing options in financial derivatives, based on the basic probability, normal random variables, geometric Brownian motion, interest rate, arbitrage, Black-Scholes formula, valuing by expected utility, exotic options, and so on.
8th week will be examination.

In Management Science 2, the lecture includes mathematical expression of multivariate statistical data, multivariate regression analysis, principal component analysis, and so on.

The handout will be distributed to students. Students must learn the contents of the handout before and after each lecture.

Self Preparation and Review

Related subjects

Nothing in particular
Nothing in particular

Notes for textbook

In Management Science 1: Sheldon M. Ross, An Introduction to Mathematical Finance, Cambridge University Press, 1999.

(Reference)
1st part: David G. Luenberger, Investment Science, Oxford University Press, 1998.

In Management Science 2, the lecture materials will be distributed to students at the class.
In Management Science 1: Sheldon M. Ross, An Introduction to Mathematical Finance, Cambridge University Press, 1999.

(Reference)
1st part: David G. Luenberger, Investment Science, Oxford University Press, 1998.

In Management Science 2, the lecture materials will be distributed to students at the class.

Notes for reference

Goals to be achieved

To understand the mathematical finance theory and multivariate analysis.
To understand the mathematical finance theory and multivariate analysis.

Evaluation of achievement

In Management Science 1, scoring assignment will consist of term examination 80% and reports 20%.

In Management Science 2, students will be evaluated by a term report on the lecture (100%).
In Management Science 1, scoring assignment will consist of term examination 80% and reports 20%.

In Management Science 2, students will be evaluated by a term report on the lecture (100%).

Examination

Details of examination

Other information

Management Science 1: Takao Fujiwara,Office#:B-313,phone:44-6946,e-mail:fujiwara@ace.tut.ac.jp
Office Hour: 4:00 to 5:00 PM, on Wednesdays (Fujiwara)

Management Science 2: Yuzuru Miyata, Office#:B-411, phone:44-6955,e-mail:miyata@ace.tut.ac.jp
Office Hour: 4 o'clock to 5 o'clock in the afternoon, Tuesday (Prof. Miyata)

Management Science 1: Takao Fujiwara,Office#:B-313,phone:44-6946,e-mail:fujiwara@ace.tut.ac.jp
Office Hour: 4:00 to 5:00 PM, on Wednesdays (Fujiwara)

Management Science 2: Yuzuru Miyata, Office#:B-411, phone:44-6955,e-mail:miyata@ace.tut.ac.jp
Office Hour: 4 o'clock to 5 o'clock in the afternoon, Tuesday (Prof. Miyata)

Reference URL

http://pm.hse.tut.ac.jp/kakenA/
http://pm.hse.tut.ac.jp/kakenA/

Office hours

Management Science 1: Takao Fujiwara,Office Hour: 4:00 to 5:00 PM, on Wednesdays

Management Science 2: Yuzuru Miyata,Office Hour: 4 o'clock to 5 o'clock in the afternoon, Tuesday
Management Science 1: Takao Fujiwara,Office Hour: 4:00 to 5:00 PM, on Wednesdays

Management Science 2: Yuzuru Miyata,Office Hour: 4 o'clock to 5 o'clock in the afternoon, Tuesday

Relations to attainment objectives of learning and education

Key words

finance, stochastic process, multivariate analysis
finance, stochastic process, multivariate analysis

(M40030050)Japanese Life Today[Japanese Life Today]

Subject name[English]	Japanese Life Today[Japanese Life Today]				
Schedule number	M40030050	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Wed.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	氏平 明 UJIHIRA Akira				
Numbering					

Objectives of class

Course Objective:
As one of the subkects in Liberal Arts, the shortest way to know a nation or a tribe is to learn its history. So through a lecture on the outline of a comeplete history of Japan(about 2000years), you will get the core of the Japan and Japanese.
Course Objective:
As one of the subkects in Liberal Arts, the shortest way to know a nation or a tribe is to learn its history. So through a lecture on the outline of a comeplete history of Japan(about 2000years), you will get the core of the Japan and Japanese.

Contents of class

Course Content;「日本事情」(Japanese Life Today):
「日本史概観」(The outline of a complete Japanese history)

1 Jomon Period : its simple earthenwave and life
2 Yayoi Period : rice farming and immigrants
3 Kofun Period : formation of the state
4 Asuka Period : buddahism and cultute
5 Nara Period : politival development
6 Heian Period : landholding system and literature
7 Kamakura Period : structure of worrior society
8 Muromachi Period : central government vs rocal government
9 Azuchi-Momoyama Period : institutional developments
10 Edo Period 1 : establishment of power structure
11 Edo Period 2 : economicaldevelopment and cultural
12 Meiji Period : constitutional government and war
13 Taisho Period : democracy and world war I
14 Showa Period : before world war II
15 Showa and Heisei: post world war II

This course is taught in English. There are some Japanese language supports in the text book.

Course Content;「日本事情」(Japanese Life Today):
「日本史概観」(The outline of a complete Japanese history)

1 Jomon Period : its simple earthenwave and life
2 Yayoi Period : rice farming and immigrants
3 Kofun Period : formation of the state
4 Asuka Period : buddahism and cultute
5 Nara Period : politival development
6 Heian Period : landholding system and literature
7 Kamakura Period : structure of worrior society
8 Muromachi Period : central government vs rocal government
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15 Showa and Heisei: post world war II

This course is taught in English. There are some Japanese language supports in the text book.

Self Preparation and Review

Related subjects
Nothing
Nothing

Notes for textbook
Textbook:
英文日本大事典編「英語で読む日本史：Japanese History」Bilingual books（講談社）
Reference Books:
R.H.P.Maswon & J.G.Caiger "A History of Japan" New Edition Paperback
D.Keen "Appreciation of Jaqpanese Culture" 講談社
Textbook:
英文日本大事典編「英語で読む日本史：Japanese History」Bilingual books（講談社）
Reference Books:
R.H.P.Maswon & J.G.Caiger "A History of Japan" New Edition Paperback
D.Keen "Appreciation of Jaqpanese Culture" 講談社

Notes for reference

Goals to be achieved
Learning Goals:
(1) To understand the root and character of Japanese matters
(2) To understand the background of modern Japanese politics, economics,
cultures, religions, and technology

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(1) To understand the root and character of Japanese matters
(2) To understand the background of modern Japanese politics, economics,
cultures, religions, and technology

Evaluation of achievement
Grading:
Final Test 100%

Grading:
Final Test 100%

Examination

Details of examination

Other information
Office:0532-44-6956
mail: ujihira@las.tut.ac.jp
Office:0532-44-6956
mail: ujihira@las.tut.ac.jp

Reference URL
http://las.tut.ac.jp/~ujihira/
http://las.tut.ac.jp/~ujihira/

Office hours
Office Hours:
Wednesdays 16:30~18:30
(Anytime during regular working hours)

Office Hours:
Wednesdays 16:30~18:30
(Anytime during regular working hours)

Relations to attainment objectives of learning and education
Key words
history, culture, religion, war, politics and economics
history, culture, religion, war, politics and economics

(M40030060)Intercultural Communication[Intercultural Communication]

Subject name[English]	Intercultural Communication[Intercultural Communication]				
Schedule number	M40030060	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	村松　由起子 MURAMATSU Yukiko				
Numbering					

Objectives of class

This is a Japanese conversation class mixed with the international and Japanese students of the regular course. The students will learn basic Japanese grammar to speak Japanese.

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Contents of class

This class has the following three parts.

①Japanese grammar points for group activities
②Group activities (conversation practice & discussion)
③Elementary Japanese lessons

You will learn the following lessons in Japanese textbook "Minna no Nihongo".
1. Pronunciation of Japanese & Lesson 1
2. Pronunciation of Japanese & Lesson 2
3. Lesson 3,4
4. Lesson 5,6
5. Lesson 7,8
6. Lesson 9,10
7. Lesson 11,12
8. Lesson 13,14
9. Lesson 15,16
10.Lesson 17,18
11.Lesson 19,20
12.Lesson 21,Nonverbal communication
13.Nonverbal communication
14.Lesson 22,23
15.Lesson 24,25

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①Japanese grammar points for group activities
②Group activities (conversation practice & discussion)
③Elementary Japanese lessons

You will learn the following lessons in Japanese textbook "Minna no Nihongo".
1. Pronunciation of Japanese & Lesson 1
2. Pronunciation of Japanese & Lesson 2
3. Lesson 3,4
4. Lesson 5,6
5. Lesson 7,8
6. Lesson 9,10
7. Lesson 11,12

8. Lesson 13,14
9. Lesson 15,16
10.Lesson 17,18
11.Lesson 19,20
12.Lesson 21,Nonverbal communication
13.Nonverbal communication
14.Lesson 22,23
15.Lesson 24,25

Self Preparation and Review

Related subjects

Extra-Curricular Japanese Classes (Nihongo Hokoo):If you want to know more details, please contact the International Affairs Division (Kokusaikooryuuka).

Extra-Curricular Japanese Classes (Nihongo Hokoo):If you want to know more details, please contact the International Affairs Division (Kokusaikooryuuka).

Notes for textbook

みんなの日本語　初級Ⅰ翻訳・文法解説　英語版(Minnna no Nihongo 1 Translation & Grammatical Notes　English) ￥2,000
みんなの日本語　初級Ⅰ翻訳・文法解説　英語版(Minnna no Nihongo 1 Translation & Grammatical Notes　English) ￥2,000

Notes for reference

Goals to be achieved

Evaluation of achievement

Homework 40%
The term examination (L.1～L.22)60%
Homework 40%
The term examination (L.1～L.22)60%

Examination

Details of examination

Other information

office:　B-513
e-mail:　yukiko@las.tut.ac.jp
phone:　44-6962
office:　B-513
e-mail:　yukiko@las.tut.ac.jp
phone:　44-6962

Reference URL

Office hours

Monday 13:00-13:30
Monday 13:00-13:30

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on 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**	Experiment	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員, 各教員 1kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the 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 presentation skill.

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

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**	Experiment	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員, 各教員 1kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the 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 presentation skill.

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei 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 relevant knowledge.

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the 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. Contact with your supervisor.

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Presentation(10%), Abstract of the thesis(10%), Thesis(20%), Coursework(30%), Outcomes(30%).

Presentation(10%), Abstract of the thesis(10%), Thesis(20%), Coursework(30%), Outcomes(30%).

Examination

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				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員, 各教員 1kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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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.

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Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Examination

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員, 各教員 1kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
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 relevant knowledge.

The thesis research aims to provide a practical experience of research work, and to acquire his/her research skill with deep understanding of the 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. Contact with your supervisor.

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Presentation(10%), Abstract of the thesis(10%), Thesis(20%), Coursework(30%), Outcomes(30%).

Presentation(10%), Abstract of the thesis(10%), Thesis(20%), Coursework(30%), Outcomes(30%).

Examination

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員, 各教員 1kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the 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 presentation skill.

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M41630030)Applied Mechanics of Materials[Applied Mechanics of Materials]

Subject name[English]	Applied Mechanics of Materials[Applied Mechanics of Materials]				
Schedule number	M41630030	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	足立　忠晴 ADACHI Tadaharu				
Numbering					

Objectives of class

To understand mechanical performances of structures, and mechanical behaviors of solid and structures, fundamental mechanics of solid and structure is lectured. Especially, mechanics of thin-walled structures which is useful for practical design of mechanical structures is explained in detail.

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Contents of class

Chapter 1. Introduction
Chapter 2. Automobile Structures from View of Solid Mechanics
Purpose of automobile structure, Loading to automobile structure
Deformation of automobile structure, Performance of automobile structure
Chapter 3. Fundamentals of Structural Mechanics
Fundamental equations in solid mechanics
Chapter 4. Forces and Moments Applying to Structures
Normal force, shear force, bending moment, torsional moment
Chapter 5. Elementary Mechanics of Structures
Torsion and bending of thin-walled beams
Chapter 6. Mechanics of Thin-Walled Structures
Torsion and bending of thin-walled beams
Chapter 7. Fundamentals of Dynamic Measurement
Frequency response, Strain gage, Load cell, Accelerator
Chapter 8. Summary

Chapter 1. Introduction
Chapter 2. Automobile Structures from View of Solid Mechanics
Purpose of automobile structure, Loading to automobile structure
Deformation of automobile structure, Performance of automobile structure
Chapter 3. Fundamentals of Structural Mechanics
Fundamental equations in solid mechanics
Chapter 4. Forces and Moments Applying to Structures
Normal force, shear force, bending moment, torsional moment
Chapter 5. Elementary Mechanics of Structures
Torsion and bending of thin-walled beams
Chapter 6. Mechanics of Thin-Walled Structures
Torsion and bending of thin-walled beams
Chapter 7. Fundamentals of Dynamic Measurement
Frequency response, Strain gage, Load cell, Accelerator
Chapter 8. Summary

Self Preparation and Review

Related subjects

Mechanics of Materials, Elasticity, Solid Mechanics

Mechanics of Materials, Elasticity, Solid Mechanics

Notes for textbook

Text will be distributed in class
The following books are referred;
・Fung YC: A First Course in Continuum Mechanics, Prentice-Hall.

・Benham PP, Crawford RJ and Armstrong CG: Mechanics of Engineering Materials, Longman
・Fung YC and Pin T: Classical and Computational Solid Mechanics, (2001), World Scientific.
・Landau L.D. and Lifshitz E.M., Theory of Elasticity, Course of Theoretical Physics Vol.7, (1970) Pergamon Press.
・Timoshenko S, Woinowsky-Krieger S: Theory of Plates and Shells, (1970), MrGraw-Hill.
・Megson THG: Aircraft Structures for Engineering Students, (2007), Butterworth-Heinemann.
Text will be distributed in class
The following books are referred;
・Fung YC: A First Course in Continuum Mechanics, Prentice-Hall.
・Benham PP, Crawford RJ and Armstrong CG: Mechanics of Engineering Materials, Longman
・Fung YC and Pin T: Classical and Computational Solid Mechanics, (2001), World Scientific.
・Landau L.D. and Lifshitz E.M., Theory of Elasticity, Course of Theoretical Physics Vol.7, (1970) Pergamon Press.
・Timoshenko S, Woinowsky-Krieger S: Theory of Plates and Shells, (1970), MrGraw-Hill.
・Megson THG: Aircraft Structures for Engineering Students, (2007), Butterworth-Heinemann.

Notes for reference

Goals to be achieved

To understand physical meaning fundamental equations in solid mechanics.
To deeply understand elementary mechanics of materials (strength of materials); tension of bar, torsion of axis and bending of beam.
To understand mechanics of thin-walled structures.
To know concept of dynamic measurement of deformation.
To understand physical meaning fundamental equations in solid mechanics.
To deeply understand elementary mechanics of materials (strength of materials); tension of bar, torsion of axis and bending of beam.
To understand mechanics of thin-walled structures.
To know concept of dynamic measurement of deformation.

Evaluation of achievement

Examinations, 80 % and attendances, 20 %
Examinations, 80 % and attendances, 20 %

Examination

Details of examination

Other information

Prof Tadaharu Adachi, Room D-305, Extension phone 6664, Email adachi@me.tut.ac.jp
Prof Tadaharu Adachi, Room D-305, Extension phone 6664, Email adachi@me.tut.ac.jp

Reference URL

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

Office hours

Anytime. Contact me by email before coming if possible.
Anytime. Contact me by email before coming if possible.

Relations to attainment objectives of learning and education

Key words

Strength of materials, Mechanics of materials, solid mechanics, Structural mechanics, Thin-walled Structure
Strength of materials, Mechanics of materials, solid mechanics, Structural mechanics, Thin-walled Structure

(M41630060)Practical Surface Analysis[Practical Surface Analysis]

Subject name[English]	Practical Surface Analysis[Practical Surface Analysis]				
Schedule number	M41630060	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Mon.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	竹市　嘉紀 TAKEICHI Yoshinori				
Numbering					

Objectives of class

(1) To introduce the students into the AES (Auger Electron Spectroscopy) analysis; understanding many kinds of information obtained with AES and how to use its information in actual research activity.
(2) To give students the understanding of electro-physics in surface analysis and the principal of surface analysis methods.
(3) To provide the student with opportunity to involve in some actual analysis: quantitative and qualitative analysis.

(1) To introduce the students into the AES (Auger Electron Spectroscopy) analysis; understanding many kinds of information obtained with AES and how to use its information in actual research activity.
(2) To give students the understanding of electro-physics in surface analysis and the principal of surface analysis methods.
(3) To provide the student with opportunity to involve in some actual analysis: quantitative and qualitative analysis.

Contents of class

(1) Study about the fundamental of electro-physics in surface analysis and understanding the physical significance of obtained data.
a. Interaction of Electron and Material
b. Generation of Auger Electron
c. Ionization Cross-Section
d. Auger Transition Probability
e. Effect of Back Scattering Electron
(2) Understanding the data processing method on actually obtained spectrum and understanding qualitative analysis and quantitative analysis.
a. Smoothing Processing
b. Differentiation Processing
c. Savitzky-Golay Method
d. Qualitative Analysis
e. Depth Profiling Analysis

(1) Study about the fundamental of electro-physics in surface analysis and understanding the physical significance of obtained data.
a. Interaction of Electron and Material
b. Generation of Auger Electron
c. Ionization Cross-Section
d. Auger Transition Probability
e. Effect of Back Scattering Electron
(2) Understanding the data processing method on actually obtained spectrum and understanding qualitative analysis and quantitative analysis.
a. Smoothing Processing
b. Differentiation Processing
c. Savitzky-Golay Method
d. Qualitative Analysis
e. Depth Profiling Analysis

Self Preparation and Review

Related subjects

None.

None.

Notes for textbook

Textbook of this class is available from the following web pages.
Please download the textbook from the following URL.
http://d-304.me.tut.ac.jp
http://tribo.me.tut.ac.jp/class/class.html

Reference:
Practical Surface Analysis by Auger and X-ray Photoelectron Spectoroscopy
Edited by D. Briggs and M. P. Seah, John Wiley & Sons Ltd., Sussex

Textbook of this class is available from the following web pages.
Please download the textbook from the following URL.
http://d-304.me.tut.ac.jp
http://tribo.me.tut.ac.jp/class/class.html

Reference:
Practical Surface Analysis by Auger and X-ray Photoelectron Spectoroscopy
Edited by D. Briggs and M. P. Seah, John Wiley & Sons Ltd., Sussex

Notes for reference

Goals to be achieved

(1) Acquire a basic knowledge about AES (Auger Electron Spectroscopy) analysis; understanding many kinds of information obtained with AES and how to use its information in actual research activity.
(2) Understanding the basic of electro-physics in surface analysis and the principal of surface analysis methods.

(1) Acquire a basic knowledge about AES (Auger Electron Spectroscopy) analysis; understanding many kinds of information obtained with AES and how to use its information in actual research activity.
(2) Understanding the basic of electro-physics in surface analysis and the principal of surface analysis methods.

Evaluation of achievement

Report: 100%

Report: 100%

Examination

Details of examination

Other information

Dr. Yoshinori TAKEICHI, Room: D-304, E-Mail: takeichi@tut.jp

Dr. Yoshinori TAKEICHI, Room: D-304, E-Mail: takeichi@tut.jp

Reference URL

http://tribo.me.tut.ac.jp/class/class.html
http://d-304.me.tut.ac.jp

http://tribo.me.tut.ac.jp/class/class.html
http://d-304.me.tut.ac.jp

Office hours

Please contact me by an e-mail.

Please contact me by an e-mail.

Relations to attainment objectives of learning and education

Key words
surface analysis, AES, Auger electron spectroscopy
surface analysis, AES, Auger electron spectroscopy

(M41630080)Science and Technology of Thin Films[Science and Technology of Thin Films]

Subject name[English]	Science and Technology of Thin Films[Science and Technology of Thin Films]				
Schedule number	M41630080	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	伊﨑　昌伸 IZAKI Masanobu				
Numbering					

Objectives of class

To understand fundamental thermodynamics and solid state physics of thin film and the solution chemical preparation.
To understand fundamental thermodynamics and solid state physics of thin film and the solution chemical preparation.

Contents of class

1. Introduction to Thin film and preparation, soft-solution processing
2. Thermodynamics in soft-solution processing(I)
3. Thermodynamics in soft-solution processing(II)
4. Electronic state in inorganic thin films
5. Crystal structure and symmetry on thin films
6. Structural analysis of thin films
7. Physical properties of thin films
8. Oxide semiconductor thin films and application

1. Introduction to Thin film and preparation, soft-solution processing
2. Thermodynamics in soft-solution processing(I)
3. Thermodynamics in soft-solution processing(II)
4. Electronic state in inorganic thin films
5. Crystal structure and symmetry on thin films
6. Structural analysis of thin films
7. Physical properties of thin films
8. Oxide semiconductor thin films and application

Self Preparation and Review

Related subjects

Basic knowledge of chemistry and solid-state physics
Basic knowledge of chemistry and solid-state physics

Notes for textbook

Handout
Reference: Modern Electroplating, 5th edition, John Wiley & Sons
Handout
Reference: Modern Electroplating, 5th edition, John Wiley & Sons

Notes for reference

Goals to be achieved

1. Understanding of thermodynamic in soft-solution processing
2. Understanding of the basic solid state physics of thin films
1. Understanding of thermodynamic in soft-solution processing
2. Understanding of the basic solid state physics of thin films

Evaluation of achievement

Reports(50%) and presentation(50%)
Reports(50%) and presentation(50%)

Examination

Details of examination

Other information Masanobu Izaki, D-505, m-izaki@me.tut.ac.jp Masanobu Izaki, D-505, m-izaki@me.tut.ac.jp
Reference URL
Office hours as-needed as-needed
Relations to attainment objectives of learning and education
Key words electrochemistry, oxide, compound, thin film, electrochemistry, oxide, compound, thin film,

(M41630140)Robotics[Robotics]

Subject name[English]	Robotics[Robotics]				
Schedule number	M41630140	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering					

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.

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.

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.
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2-1. Description of relative positions and orientations of manipulator links.
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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

Related subjects

Fundamentals of linear algebra, mechanics and control theory.

Fundamentals of linear algebra, mechanics and control theory.

Notes for textbook

Handouts will be prepared.

(Reference)
J. J. Craig, Introduction to Robotics: Mechanics and Control, 3rd Edition, Prentice Hall, 2005.
M. W. Spong, S. Hutchinson, M. Vidyasagar, Robot Modeling and Control, John Wiley & Sons, 2006.
Handouts will be prepared.

(Reference)
J. J. Craig, Introduction to Robotics: Mechanics and Control, 3rd Edition, Prentice Hall, 2005.
M. W. Spong, S. Hutchinson, M. Vidyasagar, Robot Modeling and Control, John Wiley & Sons, 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.
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.
Grade will be determined only from the end-of-term exam score.

Examination

Details of examination

Other information

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

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M41630300)High-Speed Mechanics and Optical Measurement[High-Speed Mechanics and Optical Measurement]

Subject name[English]	High-Speed Mechanics and Optical Measurement[High-Speed Mechanics and Optical Measurement]				
Schedule number	M41630300	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	鈴木　新一 SUZUKI Shinichi				
Numbering					

Objectives of class

1. Interaction between light and atom, and principle of lasers.
2. Mechanism and electric circuit of pulsed lasers.
3. Optical measurement methods on dynamic fracture mechanics.
4. Accurate optical methods in mechanical engineering.

1. Interaction between light and atom, and principle of lasers.
2. Mechanism and electric circuit of pulsed lasers.
3. Optical measurement methods on dynamic fracture mechanics.
4. Accurate optical methods in mechanical engineering.

Contents of class

1st week Interaction between light and atoms.
2nd week Interaction between light and atoms.
3rd week Principle of lasers.
4th week Reflection and polarization of light, Brewster window.
5th week Birefringence material and Pockels cell.
6th week Principle of pulsed lasers.
7th week Principle of pulsed lasers.
8th week Photoelasticity
9th week Residual stress measurement by photoelasticity
10th week Moire interferometry.
11th week Measurement of crack opening displacement by Moire interferometry.
12th week Holography.
13th week High-speed holographic microscopy for dynamic fracture mechanics.
14th week Dynamic fracture mechanics, stress intensity factor and energy release rate.
15th week Energy release rate at rapid crack bifurcation.

1st week Interaction between light and atoms.
2nd week Interaction between light and atoms.
3rd week Principle of lasers.
4th week Reflection and polarization of light, Brewster window.
5th week Birefringence material and Pockels cell.
6th week Principle of pulsed lasers.
7th week Principle of pulsed lasers.
8th week Photoelasticity
9th week Residual stress measurement by photoelasticity
10th week Moire interferometry.
11th week Measurement of crack opening displacement by Moire interferometry.
12th week Holography.
13th week High-speed holographic microscopy for dynamic fracture mechanics.
14th week Dynamic fracture mechanics, stress intensity factor and energy release rate.
15th week Energy release rate at rapid crack bifurcation.

Self Preparation and Review

Related subjects

Physics I, Physics II, Physics III, Physics IV, Strength of Materials, Theory of elasticity, Fracture mechanics.

Physics I, Physics II, Physics III, Physics IV, Strength of Materials, Theory of elasticity, Fracture mechanics.

Notes for textbook

(1) Loudon,R., The Quantum Theory of Light, Oxford Science Publications, 2000.
(2) Yariv,A. and Yeh,P., Photonics, Oxford University Press, 2007.
(3) Suzuki,S., et al., Measurement of energy release rate and energy flux
of rapidly bifurcating crack in Homalite 100 and Araldite B by high-speed holographic microscopy, J. Mech. Phys. Solids, Vol.55 (2007), 1487?1512.
(4) Suzuki,S. and Miyashita,T., Measuremet of Opening Displacement and Stress Intensity Factor of Bifurcated Notch by Moire Interferometry, J. Solid Mech. Materials Eng., Vol.2 (2008), 25-37.
(5) Shinichi Suzuki, et al., Measurement of Residual Stress of Light Bulbs for Automobiles by Photoelasticity, J. Japanese Soc. Experimental Mech., Vol.11 (2011), 188-194.

(1) Loudon,R., The Quantum Theory of Light, Oxford Science Publications, 2000.
(2) Yariv,A. and Yeh,P., Photonics, Oxford University Press, 2007.
(3) Suzuki,S., et al., Measurement of energy release rate and energy flux
of rapidly bifurcating crack in Homalite 100 and Araldite B by high-speed holographic microscopy, J. Mech. Phys. Solids, Vol.55 (2007), 1487?1512.
(4) Suzuki,S. and Miyashita,T., Measuremet of Opening Displacement and Stress Intensity Factor of Bifurcated Notch by Moire Interferometry, J. Solid Mech. Materials Eng., Vol.2 (2008), 25-37.
(5) Shinichi Suzuki, et al., Measurement of Residual Stress of Light Bulbs for Automobiles by Photoelasticity, J. Japanese Soc. Experimental Mech., Vol.11 (2011), 188-194.

Notes for reference

Goals to be achieved

1. Can understand the structure, optical system and electric circuit of pulsed lasers.
2. Can oscillate pulsed lasers with alining its optical components.
3. Can take place experiments with high speed holographic microscopy.

1. Can understand the structure, optical system and electric circuit of pulsed lasers.
2. Can oscillate pulsed lasers with alining its optical components.
3. Can take place experiments with high speed holographic microscopy.

Evaluation of achievement

Evaluation by a written homework assignment

Evaluation by a written homework assignment

Examination

Details of examination

Other information

Office: D-408
Tel: 0532-44-6678
e-mail: shinichi@tut.jp

Office: D-408
Tel: 0532-44-6678
e-mail: shinichi@tut.jp

Reference URL

Office hours

From 4:00 to 5:00pm, every Tuesday.

From 4:00 to 5:00pm, every Tuesday.

Relations to attainment objectives of learning and education

Key words
Interaction of light and atoms, Laser, Optical measurement, Dynamic fracture mechanics
Interaction of light and atoms, Laser, Optical measurement, Dynamic fracture mechanics

(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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S2系教務委員 KAKUKYOUIN Kakukyouin, 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 engineering.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S2系教務委員, 各教員 2kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
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 engineering.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S2系教務委員, 各教員 2kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
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 engineerinng.

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 engineerinng.

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M42630020)Physics for Electronics[Physics for Electronics]

Subject name[English]	Physics for Electronics[Physics for Electronics]				
Schedule number	M42630020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Wed.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	福田　光男, 井上　光輝, 松田　厚範 FUKUDA Mitsuo, INOUE Mitsuteru, MATSUDA Atsunori				
Numbering					

Objectives of class

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

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

Contents of class

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

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

The course of photonics is devoted to the understanding of interactions
between photon (light wave) and materials based on the quantum theory and also to industrial applications of photonic devices. 1) Physics and photonic devices, 2) dielectric function, plasmon, and polariton, 3) optical processes in semiconductors and exciton, 4) absorption and stimulated emission, 5) light wave modulation, 6) photonic devices update.

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

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

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

The course of photonics is devoted to the understanding of interactions
between photon (light wave) and materials based on the quantum theory and also to industrial applications of photonic devices. 1) Physics and photonic devices, 2) dielectric function, plasmon, and polariton, 3) optical processes in semiconductors and exciton, 4) absorption and stimulated emission, 5) light wave modulation, 6) photonic devices update.

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

Self Preparation and Review

Related subjects

Notes for textbook

None

None

Notes for reference

Goals to be achieved

(1) To understand fundamental aspects on functional materials, photonics and spin electronics.

(2) To get the knowledge on the latest technologies on these physical phenomena.

(1) To understand fundamental aspects on functional materials, photonics and spin electronics.

(2) To get the knowledge on the latest technologies on these physical phenomena.

Evaluation of achievement

Examination results 30% for each categories (functional materials, photonics, spin electronics) and 10% report, then the final evaluation will be the sum of these marks.

Examination results 30% for each categories (functional materials, photonics, spin electronics) and 10% report, then the final evaluation will be the sum of these marks.

Examination

Details of examination

Other information

Spin electronics; Mitsuteru Inoue: inoue@ee.tut.ac.jp

Photonics; Mitsuo Fukuda: fukuda@ee.tut.ac.jp

functional materials; Atsunori Matuda： matsuda@ee.tut.ac.jp

Spin electronics; Mitsuteru Inoue: inoue@ee.tut.ac.jp

Photonics; Mitsuo Fukuda: fukuda@ee.tut.ac.jp

functional materials; Atsunori Matuda： matsuda@ee.tut.ac.jp

Reference URL

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

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

Office hours

one hour after every classes

one hour after every classes

Relations to attainment objectives of learning and education

Key words

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

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

(M42630070)Information and Communication Technology[Information and Communication Technology]

Subject name[English]	Information and Communication Technology[Information and Communication Technology]				
Schedule number	M42630070	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	大平 孝, 上原 秀幸 OHIRA Takashi, UEHARA Hideyuki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

Lecture on the blackboard without resorting to textbooks.

Lecture on the blackboard without resorting to textbooks.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Marks are based on the final test.

Marks are based on the final test.

Examination

Details of examination

Other information

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

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

Reference URL

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

Office hours

Appoint a time slot via email
Appoint a time slot via email

Relations to attainment objectives of learning and education

(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

(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

microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element
microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element

(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**	Experiment	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

Details of examination

Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
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**	Experiment	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

(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				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and 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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

It is usually the case that thesis research is carried out on individual bases with specific contents differing from one student to another.
Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Subject name[English]	Seminar on 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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

Details of examination

Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M43630020)System Design Project[System Design Project]

Subject name[English]	System Design Project[System Design Project]				
Schedule number	M43630020	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.4 ～ 4,Fri.4 ～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The project 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 design ability for their thesis research such as the purpose, the background knowledge, the research topic, the plan/schedule and to present the progress.

The project 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 design ability for their thesis research such as the purpose, the background knowledge, the research topic, the plan/schedule and to present the progress.

Contents of class

It is usually the case that the project is carried out on individual bases with specific contents differing from on student to another.
Consult with your advisor for any further details.

It is usually the case that the project is carried out on individual bases with specific contents differing from on student to another.
Consult with your advisor for any further details.

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

To acquire design abilities for doing research and development at technically high level and leading large scale research projects

To acquire design abilities for doing research and development at technically high level and leading large scale research projects

Evaluation of achievement

Will be evaluated by the poster presentation and report including the research purpose, background knowledge,research topic,plan/scheduling and progress.

Will be evaluated by the poster presentation and report including the research purpose, background knowledge,research topic,plan/scheduling and progress.

Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M43630070)Applied Informatics[Applied Informatics]

Subject name[English]	Applied Informatics[Applied Informatics]				
Schedule number	M43630070	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	加藤　博明 KATO Hiroaki				
Numbering					

Objectives of class

The purpose of this course is to introduce and explain practical and applied approaches to data analysis (or mining) and knowledge discovery with illustrative examples in chemistry and molecular biology. The course is helpful for the students who are interested in not only pursuing careers in chemo-informatics but also taking general data science.

The purpose of this course is to introduce and explain practical and applied approaches to data analysis (or mining) and knowledge discovery with illustrative examples in chemistry and molecular biology. The course is helpful for the students who are interested in not only pursuing careers in chemo-informatics but also taking general data science.

Contents of class

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships (QSAR)
11.Principal component analysis (PCA) and data visualization
12.Data clustering
13.Linear binary pattern classifier and perceptron model
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships (QSAR)
11.Principal component analysis (PCA) and data visualization
12.Data clustering
13.Linear binary pattern classifier and perceptron model
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Self Preparation and Review

Related subjects
Database, Molecular Information Systems, Linear Algebra, Elementary Analytics
Database, Molecular Information Systems, Linear Algebra, Elementary Analytics

Notes for textbook
Material will be made available in the form of hard copies or on the class website (to be announced).

Material will be made available in the form of hard copies or on the class website (to be announced).

Notes for reference

Goals to be achieved
First half term (by Kato)
/They understand structure and information of biomacromolecules.
/They understand the basic concept of molecular biology database, and learn knowledge discovery techniques such as sequence alignment.

Second half term (by Takahashi)
/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.
/They learn mathematical basis of principal component analysis and visualization of multivariate data space based on the method.
/They study how they can avoid chance correlation problems in the case of a large number of explain variables to be used in the analysis.
/They understand mathematical basis of artificial neural network (ANN) and support vector machine (SVM) as the basics of machine learning. They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

First half term (by Kato)
/They understand structure and information of biomacromolecules.
/They understand the basic concept of molecular biology database, and learn knowledge discovery techniques such as sequence alignment.

Second half term (by Takahashi)
/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.
/They learn mathematical basis of principal component analysis and visualization of multivariate data space based on the method.
/They study how they can avoid chance correlation problems in the case of a large number of explain variables to be used in the analysis.
/They understand mathematical basis of artificial neural network (ANN) and support vector machine (SVM) as the basics of machine learning. They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

Evaluation of achievement
Reports and classroom performance 20%
Written examination 80%
Reports and classroom performance 20%
Written examination 80%

Examination

Details of examination

Other information
Office: F-304 (Ext. 6879) Email: kato@cs.tut.ac.jp (Kato)

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

Office: F-304 (Ext. 6879) Email: kato@cs.tut.ac.jp (Kato)
Office: F-303 (Ext. 6878) Email: taka@cs.tut.ac.jp (Takahashi)

Reference URL

http://www.mbi.cs.tut.ac.jp/~kato/lecture/ (Kato)
http://www.mis.cs.tut.ac.jp/ (Takahashi)

http://www.mbi.cs.tut.ac.jp/~kato/lecture/ (Kato)
http://www.mis.cs.tut.ac.jp/ (Takahashi)

Office hours

Friday 15:00-16:30 (Kato)
Friday 13:00-14:30 (Takahashi)
Friday 15:00-16:30 (Kato)
Friday 13:00-14:30 (Takahashi)

Relations to attainment objectives of learning and education

Key words

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

(M43630090)Multimodal Information Processing[Multimodal Information Processing]

Subject name[English]	Multimodal Information Processing[Multimodal Information Processing]				
Schedule number	M43630090	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Wed.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	桂田　浩一 KATSURADA Koichi				
Numbering					

Objectives of class

Important topics on multimodal information processing will be discussed.
Important topics on multimodal information processing will be discussed.

Contents of class

1. What is multimodal information processing?
2. Speech processing
3. Dialogue processing
4. Facial image processing
5. Multimodal interaction systems

1. What is multimodal information processing?
2. Speech processing
3. Dialogue processing
4. Facial image processing
5. Multimodal interaction systems

Self Preparation and Review

Related subjects

Advanced Robotics and Informatics, Speech and Language Processing, Image Processing, Advanced
Advanced Robotics and Informatics, Speech and Language Processing, Image Processing, Advanced

Notes for textbook

Handouts will be prepared.
Handouts will be prepared.

Notes for reference

Goals to be achieved

To understand fundamental techniques on multimodal information processing.

To understand fundamental techniques on multimodal information processing.

Evaluation of achievement

report (50%), final examination (50%)
report (50%), final examination (50%)

Examination

Details of examination

Other information

Kouichi Katsurada (F408, 6884, katsurada@cs.tut.ac.jp)

Kouichi Katsurada (F408, 6884, katsurada@cs.tut.ac.jp)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

speech intereaction, multimodal interaction

speech intereaction, multimodal interaction

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

Subject name[English]	Quantum Biology and Materials Science[Quantum Biology and Materials Science]				
Schedule number	M43630160	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Wed.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	関野　秀男, 栗田　典之 SEKINO Hideo, KURITA Noriyuki				
Numbering					

Objectives of class

The objective of this class is to understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry, that is, molecular orbital (MO) theory. In achieving this objective, we will attempt to acquire the elementary concepts in MO theory, and learn about the electronic properties of biological molecules such as proteins, RNA and DNA.

The objective of this class is to understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry, that is, molecular orbital (MO) theory. In achieving this objective, we will attempt to acquire the elementary concepts in MO theory, and learn about the electronic properties of biological molecules such as proteins, RNA and DNA.

Contents of class

Considering the preliminary knowledge of the participates in this class, some topics from the following things will be chosen to be learned.

(1)
Basis and elementary concepts for molecular orbital (MO) theory
(From the 1st to 5th weeks)
(2)
Applications of MO method to small molecules
(6th and 7th weeks)
(3)
MO calculations for amino acids and their peptides
(8th and 9th weeks)
(4)
MO calculations for DNA, RNA bases and base pairs
(10th and 11th weeks)
(5)
MO calculations for complexes with proteins and ligand molecules
(12th and 13th weeks)
(6)
MO calculations for DNA, RNA and their complexes with proteins
(14th and 15th weeks)

Considering the preliminary knowledge of the participates in this class, some topics from the following things will be chosen to be learned.

(1)
Basis and elementary concepts for molecular orbital (MO) theory
(From the 1st to 5th weeks)
(2)
Applications of MO method to small molecules
(6th and 7th weeks)
(3)
MO calculations for amino acids and their peptides
(8th and 9th weeks)
(4)
MO calculations for DNA, RNA bases and base pairs
(10th and 11th weeks)
(5)
MO calculations for complexes with proteins and ligand molecules

(12th and 13th weeks)
(6)
MO calculations for DNA, RNA and their complexes with proteins
(14th and 15th weeks)

Self Preparation and Review

Related subjects
Basis knowledge about quantum chemistry and biomolecules such as proteins, RNA and DNA is required.
Basis knowledge about quantum chemistry and biomolecules such as proteins, RNA and DNA is required.

Notes for textbook
(1)“Molecular orbital calculations for amino acids and peptides”, by Anne-Marie Sapse
(2)“Charge transfer in DNA”, by Hans-Achim Wagenknecht
(1)“Molecular orbital calculations for amino acids and peptides”, by Anne-Marie Sapse
(2)“Charge transfer in DNA”, by Hans-Achim Wagenknecht

Notes for reference

Goals to be achieved
To understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry
To understand basis biophysical phenomena in the organisms based on the concept of quantum chemistry

Evaluation of achievement
Presentations at the class (70%), test (30%)
Presentations at the class (70%), test (30%)

Examination

Details of examination

Other information
Room (F-306), E-mail: kurita@cs.tut.ac.jp
Room (F-306), E-mail: kurita@cs.tut.ac.jp

Reference URL

Office hours
16:00-19:00 on Wednesday
16:00-19:00 on Wednesday

Relations to attainment objectives of learning and education

Key words
DNA, protein, molecular orbital calculation, quantum chemistry
DNA, protein, molecular orbital calculation, quantum chemistry

(M43630210)Advanced Chemoinformatics[Advanced Chemoinformatics]

Subject name[English]	Advanced Chemoinformatics[Advanced Chemoinformatics]				
Schedule number	M43630210	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	高橋　由雅, 加藤　博明 TAKAHASHI Yoshimasa, KATO Hiroaki				
Numbering					

Objectives of class

The purpose of this course is to introduce and explain practical and applied approaches to data analysis (or mining) and knowledge discovery with illustrative examples in chemistry and molecular biology. The course is helpful for the students who are interested in not only pursuing careers in chemo-informatics but also taking general data science.

The purpose of this course is to introduce and explain practical and applied approaches to data analysis (or mining) and knowledge discovery with illustrative examples in chemistry and molecular biology. The course is helpful for the students who are interested in not only pursuing careers in chemo-informatics but also taking general data science.

Contents of class

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships (QSAR)
11.Principal component analysis (PCA) and data visualization
12.Data clustering
13.Linear binary pattern classifier and perceptron model
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships (QSAR)
11.Principal component analysis (PCA) and data visualization
12.Data clustering
13.Linear binary pattern classifier and perceptron model
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Self Preparation and Review

Related subjects

Database, Molecular Information Systems, Linear Algebra, Elementary Analytics

Database, Molecular Information Systems, Linear Algebra, Elementary Analytics

Notes for textbook

Material will be made available in the form of hard copies or on the class website (to be announced).

Material will be made available in the form of hard copies or on the class website (to be announced).

Notes for reference

Goals to be achieved

First half term (by Kato)

/They understand structure and information of biomacromolecules.

/They understand the basic concept of molecular biology database, and learn knowledge discovery techniques such as sequence alignment.

Second half term (by Takahashi)

/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.

/They learn mathematical basis of principal component analysis and visualization of multivariate data space based on the method.

/They study how they can avoid chance correlation problems in the case of a large number of explain variables to be used in the analysis.

/They understand mathematical basis of artificial neural network (ANN) and support vector machine (SVM) as the basics of machine learning. They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

First half term (by Kato)

/They understand structure and information of biomacromolecules.

/They understand the basic concept of molecular biology database, and learn knowledge discovery techniques such as sequence alignment.

Second half term (by Takahashi)

/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.

/They learn mathematical basis of principal component analysis and visualization of multivariate data space based on the method.

/They study how they can avoid chance correlation problems in the case of a large number of explain variables to be used in the analysis.

/They understand mathematical basis of artificial neural network (ANN) and support vector machine (SVM) as the basics of machine learning. They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

Evaluation of achievement

Reports and classroom performance 20%
Written examination 80%

Reports and classroom performance 20%
Written examination 80%

Examination

Details of examination

Other information

Office: F-304 (Ext. 6879) Email: kato@cs.tut.ac.jp (Kato)

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

Office: F-304 (Ext. 6879) Email: kato@cs.tut.ac.jp (Kato)
Office: F-303 (Ext. 6878) Email: taka@cs.tut.ac.jp (Takahashi)

Reference URL

http://www.mbi.cs.tut.ac.jp/~kato/lecture/ (Kato)
http://www.mis.cs.tut.ac.jp/ (Takahashi)

http://www.mbi.cs.tut.ac.jp/~kato/lecture/ (Kato)
http://www.mis.cs.tut.ac.jp/ (Takahashi)

Office hours

Friday 15:00-16:30 (Kato)
Friday 13:00-14:30 (Takahashi)
Friday 15:00-16:30 (Kato)
Friday 13:00-14:30 (Takahashi)

Relations to attainment objectives of learning and education

Key words

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

(M43630220)Speech and Language Processing, Advanced[Speech and Language Processing, Advanced]

Subject name[English]	Speech and Language Processing, Advanced[Speech and Language Processing, Advanced]				
Schedule number	M43630220	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	中川 聖一, 秋葉 友良 NAKAGAWA Seichi, AKIBA Tomoyoshi				
Numbering					

Objectives of class

Important topics on spoken / natural language processing will be discussed.

Important topics on spoken / natural language processing will be discussed.

Contents of class

(Nakagawa)

Basic of spoken language processing / Basic of speech recognition / Algorithm for continuous speech recognition / Hidden Markov Model / Language model, parsing and decoder/ Spoken dialog systems/

(Akiba)

Basic of information retrieval / Basic of natural language processing / Algorithms for string matching and text indexing / Modeling methods for sentences and documents / Automatic machine translation

(Nakagawa)

Basic of spoken language processing / Basic of speech recognition / Algorithm for continuous speech recognition / Hidden Markov Model / Language model, parsing and decoder/ Spoken dialog systems/

(Akiba)

Basic of information retrieval / Basic of natural language processing / Algorithms for string matching and text indexing / Modeling methods for sentences and documents / Automatic machine translation

Self Preparation and Review

Related subjects

Information theory, Formal language theory

Information theory, Formal language theory

Notes for textbook

・M.Gales & S.Young
The application of hidden markov models in speech recognition,
World Scientific

・L.R. Rabiner, R.W. Schafer
Introduction to Digital Speech Processing
World Scientific

・Richado Baeza-Yates, Berthier Bibeiro-Neto
Modern Information Retrieval
Addison Wesley

・M.Gales & S.Young
The application of hidden markov models in speech recognition,
World Scientific

・L.R. Rabiner, R.W. Schafer
Introduction to Digital Speech Processing
World Scientific

・Richado Baeza-Yates, Berthier Bibeiro-Neto
Modern Information Retrieval
Addison Wesley

Notes for reference

Goals to be achieved

Basics: Understand the role of spoken language as an human interface / Understand hierarchical structure of spoken language / Understand the basic speech analysing methods. / Understand the basic concepts of information retrieval and natural language processing
Speech Recognition: Understand the relation between speech recognition and information theory / Understand the algorithm for speech recognition using DP matching / Understand the Hidden Markov Model.
Natural Language Processing: Understand the role of language model / Understand the parser for context free language. / Understand the character encoding scheme for the world wide letters. / Understand the string matching methods and text indexing methods. / Understand the computational models for sentences, documents, and cross-language relations.
Applications: Understand the dictation system and the speedh dialog system / Understand the applications of speech technology including computer aided language learning system. / Understand the machine translation system.

Basics: Understand the role of spoken language as an human interface / Understand hierarchical structure of spoken language / Understand the basic speech analysing methods. / Understand the basic concepts of information retrieval and natural language processing
Speech Recognition: Understand the relation between speech recognition and information theory / Understand the algorithm for speech recognition using DP matching / Understand the Hidden Markov Model.
Natural Language Processing: Understand the role of language model / Understand the parser for context free language. / Understand the character encoding scheme for the world wide letters. / Understand the string matching methods and text indexing methods. / Understand the computational models for sentences, documents, and cross-language relations.
Applications: Understand the dictation system and the speedh dialog system / Understand the applications of speech technology including computer aided language learning system. / Understand the machine translation system.

Evaluation of achievement

Marks are based on final examination (50%) and reports (50%).

Marks are based on final examination (50%) and reports (50%).

Examination

Details of examination

Other information

Seiichi Nakagawa: C-506, 44-6759, nakagawa@slp.ics.tut.ac.jp
Tomoyosi Akiba: C-505, 44-6758, akiba@cs.tut.ac.jp

Seiichi Nakagawa: C-506, 44-6759, nakagawa@slp.ics.tut.ac.jp
Tomoyosi Akiba: C-505, 44-6758, akiba@cs.tut.ac.jp

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words
spoken language processing, natural language processing, human language technology
spoken language processing, natural language processing, human language technology

(M43630230)Web Data Engineering, Advanced[Web Data Engineering, Advanced]

Subject name[English]	Web Data Engineering, Advanced[Web Data Engineering, Advanced]				
Schedule number	M43630230	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	栗山 繁, 青野 雅樹 KURIYAMA Shigeru, AONO Masaki				
Numbering					

Objectives of class

Massive data analysis on the Web and visualization from archives will be discussed.
This lecture is composed of three parts. Part I deals with data analysis algorithms for huge data sets. Part II deals with information visualization techniques for massive data. Part III shows some practical techniques for implementing a system of Web-services.
Massive data analysis on the Web and visualization from archives will be discussed.
This lecture is composed of three parts. Part I deals with data analysis algorithms for huge data sets. Part II deals with information visualization techniques for massive data. Part III shows some practical techniques for implementing a system of Web-services.

Contents of class

1. Data mining for huge Web-data (Part I)
Mainly focuses on Web mining technologies including Web link analysis, Web contents mining, and Web community mining.
This part consists of 7 lectures and 1 midterm examination.
2. Information Visualization for massive data (Part II)
Mainly focuses on graphical models and visualization methods for handling multi-variable data, including exercises of developing actual visualization programs.
This part consists of 7 lectures.

1. Data mining for huge Web-data (Part I)
Mainly focuses on Web mining technologies including Web link analysis, Web contents mining, and Web community mining.
This part consists of 7 lectures and 1 midterm examination.
2. Information Visualization for massive data (Part II)
Mainly focuses on graphical models and visualization methods for handling multi-variable data, including exercises of developing actual visualization programs.
This part consists of 7 lectures.

Self Preparation and Review

Related subjects

Information Mathematics II, Media Engineering
Information Mathematics II, Media Engineering

Notes for textbook

Materials will be prepared by lecturers
References:
(1) C.D. Manning et al, Intoroduction to Information Retrieval, Cambridge Univ. Press
(2) J.Han and M. Kamber, Data Mining: Concepts and Techniques, 2nd ed, Morgan Kaufmann
(3) Colin Ware, Information Visualization: Perception for Design, Morgan Kaufmann
Materials will be prepared by lecturers
References:
(1) C.D. Manning et al, Intoroduction to Information Retrieval, Cambridge Univ. Press
(2) J.Han and M. Kamber, Data Mining: Concepts and Techniques, 2nd ed, Morgan Kaufmann
(3) Colin Ware, Information Visualization: Perception for Design, Morgan Kaufmann

Notes for reference

Goals to be achieved

Obtain the following capabilities that can
1. Implement Web-service systems for handling a large data set.
2. Implement visualization tools for massive multi-variable data.
3. Design, analyze, and evaluate the Web-based system for mining huge data.
Obtain the following capabilities that can
1. Implement Web-service systems for handling a large data set.
2. Implement visualization tools for massive multi-variable data.
3. Design, analyze, and evaluate the Web-based system for mining huge data.

Evaluation of achievement

(Part I & Part III , Aono) exercise (20%), presentation (40%), and final exam (40%)
(Part II & Part III , Kuriyama) exercise & presentation (100%)
(Part I & Part III , Aono) exercise (20%), presentation (40%), and final exam (40%)
(Part II & Part III , Kuriyama) exercise & presentation (100%)

Examination

Details of examination

Other information

Aono,Masaki(C-511)aono@tut.jp
Kuriyama,Shigeru(C-504)sk@tut.jp
Aono,Masaki(C-511)aono@tut.jp
Kuriyama,Shigeru(C-504)sk@tut.jp

Reference URL

(Part I & Part III ,Aono)
http://www.kde.cs.tut.ac.jp/~aono/myLecture.html
(Part I & Part III ,Aono)
http://www.kde.cs.tut.ac.jp/~aono/myLecture.html

Office hours

Anytime, but a priori email appointment is definitely preferable.
Anytime, but a priori email appointment is definitely preferable.

Relations to attainment objectives of learning and education

Capability of designing Web application systems.

Capability of designing Web application systems.

Key words

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

Subject name[English]	Seminar on Environmental and Life Science 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**	Experiment	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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.

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.

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

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

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

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.

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.

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

Details of examination

Other information

Supervisor
Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

(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**	Experiment	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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.

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.

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

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.

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.

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.

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

Details of examination
Other information Supervisor Supervisor
Reference URL http://ens.tut.ac.jp/en/ http://ens.tut.ac.jp/en/
Office hours Students are encouraged visiting by appointment. Students are encouraged visiting by appointment.
Relations to attainment objectives of learning and education
Key words Environmental science and technology, life science, materials science, applied chemistry Environmental science and technology, life science, materials science, applied chemistry

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

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

Objectives of class

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

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

Contents of class

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

The students will be 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
All other relevant subjects in Advanced Environmental and Life Sciences
Seminar on Environmental and Life Science I
Seminar on Environmental and Life Science II
All other relevant subjects in Advanced Environmental and Life Sciences

Notes for textbook

Supervisor(s) will recommend textbooks, papers, and research materials to students
Supervisor(s) will recommend textbooks, papers, and research materials to students

Notes for reference

Goals to be achieved

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

To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor(s)

Supervisor(s)

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

(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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

To acquire basic knowledge on environmental and life sciences
To master experimental techniques and analytical skills required for research on a given field of environmental and life sciences

To be able to present and discuss on the results of his/her research
To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

Environmental science and technology, life science, materials science, 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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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.

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.

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

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.

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.

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.

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

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

(M44630060)Applied Physical Chemistry II[Applied Physical Chemistry II]

Subject name[English]	Applied Physical Chemistry II[Applied Physical Chemistry II]				
Schedule number	M44630060	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	松本　明彦 MATSUMOTO Akihiko				
Numbering					

Objectives of class

Intermolecular interaction plays a key role in interfacial characteristics such as a mechanical property of composite materials, adsorption and separation features of molecules by porous solids. This course deals with fundamental aspect of the composite materials and basic principle of the intermolecular interaction. The adsorption and separation phenomena are also implemented based on the molecular interaction.

Intermolecular interaction plays a key role in interfacial characteristics such as a mechanical property of composite materials, adsorption and separation features of molecules by porous solids. This course deals with fundamental aspect of the composite materials and basic principle of the intermolecular interaction. The adsorption and separation phenomena are also implemented based on the molecular interaction.

Contents of class

1.Composite materials overview
2.Formation of interface and interfacial free energy
3.Molecular interaction
3-1 Electrostatic interaction, 3-2 Orientation interaction, 3-3 Induced interaction 3-4 Dispersion interaction
4.Adsorption and related phenomena
5.Control of interface interaction by regulation of the chemical structure of the interface

1.Composite materials overview
2.Formation of interface and interfacial free energy
3.Molecular interaction
3-1 Electrostatic interaction, 3-2 Orientation interaction, 3-3 Induced interaction 3-4 Dispersion interaction
4.Adsorption and related phenomena
5.Control of interface interaction by regulation of the chemical structure of the interface

Self Preparation and Review

Related subjects

Basic understanding on physical chemistry is desirable.

Basic understanding on physical chemistry is desirable.

Notes for textbook

Reference handouts will be provided in the class.

(Reference books)
[For molecular interaction]
1. J. N. Israelachivili Intermolecular and Surface Forces, 3rd Ed., Academic Press (2011).
2. Interface chemistry: D. H. Everett, Basic Principles of Colloid Science, Royal Society of Chemistry(1988).

[For adsorption]
1. F. Rouquerol, J. Rouquerol and K.S.W. Sing, Adsorption by Powders and Porous solids, Academic Press (1999)
Reference handouts will be provided in the class.

(Reference books)

[For molecular interaction]
1. J. N. Israelachivili Intermolecular and Surface Forces, 3rd Ed., Academic Press (2011).
2. Interface chemistry: D. H. Everett, Basic Principles of Colloid Science, Royal Society of Chemistry(1988).

[For adsorption]
1. F. Rouquerol, J. Rouquerol and K.S.W. Sing, Adsorption by Powders and Porous solids, Academic Press (1999)

Notes for reference

Goals to be achieved

Evaluation of achievement

30 % Homework report and/or Quiz, 70 % Final examination or report
30 % Homework report and/or Quiz, 70 % Final examination or report

Examination

Details of examination

Other information

A. Matsumoto: room # B-505, E-mail: aki@ens.tut.ac.jp
A. Matsumoto: room # B-505, E-mail: aki@ens.tut.ac.jp

Reference URL

http://material.tutms.tut.ac.jp/STAFF/MATSUMOTO/index.html.en
http://material.tutms.tut.ac.jp/STAFF/MATSUMOTO/index.html.en

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Special Topics in Applied Organic Chemistry[Special Topics in Applied Organic Chemistry]				
Schedule number	M44630100	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.5～5	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	岩佐 精二 IWASA Seiji				
Numbering					

Objectives of class

To provide you with a working knowledge of advanced synthesis of molecular materials.
To provide you with a working knowledge of advanced synthesis of molecular materials.

Contents of class

This course includes the detail of the most recent progress in modern synthetic application of catalysis, organometallics, and the total synthesis of natural products on the basis of retrosynthetic analysis.

1. Total synthesis of bioactive organic compounds.
2. Advanced modern synthetic organic reactions using transition metals.
3. Basic concept of oxidative addition and reductive elimination in catalytic cycles.
4. Synthetic applications of asymmetric synthesis and asymmetric catalysts.
5. Advanced homogeneous catalysts in industries.
6. Advanced reactions using typical elements.

This course includes the detail of the most recent progress in modern synthetic application of catalysis, organometallics, and the total synthesis of natural products on the basis of retrosynthetic analysis.

1. Total synthesis of bioactive organic compounds.
2. Advanced modern synthetic organic reactions using transition metals.
3. Basic concept of oxidative addition and reductive elimination in catalytic cycles.
4. Synthetic applications of asymmetric synthesis and asymmetric catalysts.
5. Advanced homogeneous catalysts in industries.
6. Advanced reactions using typical elements.

Self Preparation and Review

Related subjects

Subjects related to Organic Chemistry
Subjects related to Organic Chemistry

Notes for textbook

No textbook is required.
Some of information in WebCT will be help for your understanding on this course.

No textbook is required.
Some of information in WebCT will be help for your understanding on this course.

Notes for reference

Goals to be achieved

A firm understanding on catalyst, stereochemistry, reaction mechanism, and their application for the synthesis of molecular materials is achieved.

A firm understanding on catalyst, stereochemistry, reaction mechanism, and their application for the synthesis of molecular materials is achieved.

Evaluation of achievement

The report on papers from scientific journals such as J.A.C.S and Angew. Chem. will be imposed.
A design of novel organic molecular material.
The report on papers from scientific journals such as J.A.C.S and Angew. Chem. will be imposed.
A design of novel organic molecular material.

Examination

Details of examination

Other information

For more information:
Seiji Iwasa: room (B-506), e-mail (iwasa@ens.tut.ac.jp)
For more information:
Seiji Iwasa: room (B-506), e-mail (iwasa@ens.tut.ac.jp)

Reference URL

http://material.tutms.tut.ac.jp/STAFF/IWASA/index.html.ja
http://ens.tut.ac.jp/orgchem/
http://material.tutms.tut.ac.jp/STAFF/IWASA/index.html.ja
http://ens.tut.ac.jp/orgchem/

Office hours

Relations to attainment objectives of learning and education

Key words

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

(M44630180)Advanced Reaction Engineering[Advanced Reaction Engineering]

Subject name[English]	Advanced Reaction Engineering[Advanced Reaction Engineering]				
Schedule number	M44630180	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	小口　達夫 OGUCHI Tatsuo				
Numbering					

Objectives of class

This course will provide students with the opportunity to understand the basic reaction kinetics and dynamics. Especially, experimental and theoretical treatment of reaction rate constants will be given. Some reaction mechanisms in combustion or atmosphere will be also discussed.

This course will provide students with the opportunity to understand the basic reaction kinetics and dynamics. Especially, experimental and theoretical treatment of reaction rate constants will be given. Some reaction mechanisms in combustion or atmosphere will be also discussed.

Contents of class

1. Introduction.
2. Chemical reaction and rate theory.
3. Reaction mechanism.
4. Thermodynamics of reaction.
5. Reaction rate theory. (1)
6. Reaction rate theory. (2)
7. Summary

1. Introduction.
2. Chemical reaction and rate theory.
3. Reaction mechanism.
4. Thermodynamics of reaction.
5. Reaction rate theory. (1)
6. Reaction rate theory. (2)
7. Summary

Self Preparation and Review

Related subjects

Notes for textbook

(A study-aid book)
Steingfeld, Francisco, and Hase, "Chemical Kinetics and Dynamics", Prentice-hall, 1989.

(A study-aid book)
Steingfeld, Francisco, and Hase, "Chemical Kinetics and Dynamics", Prentice-hall, 1989.

Notes for reference

Goals to be achieved

Understanding reaction rate theory, reaction mechanisms.

Understanding reaction rate theory, reaction mechanisms.

Evaluation of achievement

Grades for the course will be based on the reports.

Grades for the course will be based on the reports.

Examination

Details of examination

Other information

Tatsuo Oguchi, Phone:6930

Tatsuo Oguchi, Phone:6930

Reference URL

Office hours

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

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

Relations to attainment objectives of learning and education

Physical chemistry and thermodynamics.

Physical chemistry and thermodynamics.

Key words

Reaction, Rate Theory, Transition State Theory, Lindemann Mechanism.

Reaction, Rate Theory, Transition State Theory, Lindemann Mechanism.

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

Subject name[English]	Advanced Life Science and Biotechnology II[Advanced Life Science and Biotechnology II]				
Schedule number	M44630220	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

This course will provide the students with the opportunity to study on selected subjects in the realm of advanced life science and biotechnology based on the knowledge of the course of Advanced Life Science and Biotechnology I.

This course will provide the students with the opportunity to study on selected subjects in the realm of advanced life science and biotechnology based on the knowledge of the course of Advanced Life Science and Biotechnology I.

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.

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 I

Advanced Life Science and Biotechnology I

Notes for textbook

Supervisor will recommend textbooks and papers to students.

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.

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.

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Advanced Environmental Technology II[Advanced Environmental Technology II]				
Schedule number	M44630240	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

This course will provide the students with the opportunity to study on the selected subject in the realm of further advanced environmental science and technology based on the knowledge of the course of Advanced Environmental Technology I.
This course will provide the students with the opportunity to study on the selected subject in the realm of further advanced environmental science and technology based on the knowledge of the course of Advanced Environmental Technology I.

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.
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 I
Advanced Environmental Technology I

Notes for textbook

Supervisor will recommend textbooks and papers to students.
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 papers he/she has read.

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

Evaluation of achievement

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

Examination

Details of examination

Other information

Supervisor
Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.
Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Advanced Environmental and Ecological Systems II[Advanced Environmental and Ecological Systems II]				
Schedule number	M44630260	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員, 各教員 4kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

This course will provide the students with the opportunity to study on the selected subject in the realm of further advanced environmental and ecological systems based on the knowledge of the course of Advanced Environmental and Ecological Systems I.

This course will provide the students with the opportunity to study on the selected subject in the realm of further advanced environmental and ecological systems based on the knowledge of the course of Advanced Environmental and Ecological Systems I.

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.

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 and Ecological Systems I

Advanced Environmental and Ecological Systems I

Notes for textbook

Supervisor will recommend textbooks and papers to students.

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.

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.

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

(M44630280)X-ray Spectroscopy for Catalytic Engineering[X-ray Spectroscopy for Catalytic Engineering]

Subject name[English]	X-ray Spectroscopy for Catalytic Engineering[X-ray Spectroscopy for Catalytic Engineering]				
Schedule number	M44630280	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	水嶋 生智 MIZUSHIMA Takanori				
Numbering					

Objectives of class

To gain knowledge of X-ray spectroscopic techniques including X-ray diffraction, X-ray absorption fine structure (XAFS), and fluorescent X-ray spectroscopy as analytical tools for solid catalysts.

To gain knowledge of X-ray spectroscopic techniques including X-ray diffraction, X-ray absorption fine structure (XAFS), and fluorescent X-ray spectroscopy as analytical tools for solid catalysts.

Contents of class

(1) Fundamentals of X-ray and its spectroscopy
(2) Principle, measurement techniques, and application of X-ray diffraction
(3) Principle and analysis of XAFS
(4) Measurement of XAFS using synchrotron radiation
(5) Measurement of XAFS by laboratory system
(6) Application of XAFS to catalyst characterization
(7) Advanced XAFS techniques and their applications
(8) Principle, measurement techniques, and application of fluorescent X-ray spectroscopy

(1) Fundamentals of X-ray and its spectroscopy
(2) Principle, measurement techniques, and application of X-ray diffraction
(3) Principle and analysis of XAFS
(4) Measurement of XAFS using synchrotron radiation
(5) Measurement of XAFS by laboratory system
(6) Application of XAFS to catalyst characterization
(7) Advanced XAFS techniques and their applications
(8) Principle, measurement techniques, and application of fluorescent X-ray spectroscopy

Self Preparation and Review

Related subjects

It is advisable to have basic knowledge of physical and inorganic chemistry.

It is advisable to have basic knowledge of physical and inorganic chemistry.

Notes for textbook

No textbook is required. A printed synopsis of the class will be given.

(Reference)
Y.Iwasawa et al., "X-ray absorption fine structure for catalysts and surfaces", World Scientific

No textbook is required. A printed synopsis of the class will be given.

(Reference)
Y.Iwasawa et al., "X-ray absorption fine structure for catalysts and surfaces", World Scientific

Notes for reference

Goals to be achieved

(1) Understanding of basics of X-ray spectroscopy
(2) Understanding of X-ray diffraction, XAFS, and fluorescent X-ray spectroscopy as analytical tools for solid catalysts.

(1) Understanding of basics of X-ray spectroscopy
(2) Understanding of X-ray diffraction, XAFS, and fluorescent X-ray spectroscopy as analytical tools for solid catalysts.

Evaluation of achievement
Reports 100%
Reports 100%

Examination

Details of examination

Other information
Takanori Mizushima, room : B-303, e-mail: mizushima@ens.tut.ac.jp
Takanori Mizushima, room : B-303, e-mail: mizushima@ens.tut.ac.jp

Reference URL

Office hours
Anytime
Anytime

Relations to attainment objectives of learning and education

Key words
X-ray spectroscopy, X-ray diffraction, XAFS, Fluorescent X-ray spectroscopy, Solid catalysts
X-ray spectroscopy, X-ray diffraction, XAFS, Fluorescent X-ray spectroscopy, Solid catalysts

(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**	Experiment	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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

Examination

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**	Experiment	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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

Examination

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
Numbering					

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

It depends 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.

It depends 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.

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

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				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

It depends 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.

It depends 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.

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

It depends 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.

It depends 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.

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

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**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Study on Housing System and Housing Policy[Advanced Study on Housing System and Housing Policy]				
Schedule number	M45630130	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	松島 史朗 MATSUSHIMA Shiro				
Numbering					

Objectives of class

To understand emerging architecture of humanity such as post-disaster temporary housing, refugee camp, and informal residence. With increasing number of population moving into urban area from suberves, there emerges risks with which we have to cope, especially spply of housing and related facility has to be taken into account.
For teh final projet, students are expected to conduct research to write a case study on such risks of their countries and examine necessary counter measures.
To understand emerging architecture of humanity such as post-disaster temporary housing, refugee camp, and informal residence. With increasing number of population moving into urban area from suberves, there emerges risks with which we have to cope, especially spply of housing and related facility has to be taken into account.
For teh final projet, students are expected to conduct research to write a case study on such risks of their countries and examine necessary counter measures.

Contents of class

This course takes several topics and for each topic lecture is given by instructor and research presentation is given by student assigned to the topic.
It may adopt case method with which students are expected to read cases on various topics regarding emerging risks related to architectural and housing planning, design, and urban development. Students read cases prior to the class and, at the class, they will exchange their ideas face to face in order to develop their original idas to knowledge. It is also expected to develop skills of debating. Instructor will provide appropriate instruction in timely manner for the class discussion along with giving lecture at the class.
1. Introduction
2/3. Architecture after 3.11
4/5. Lecture on Architectural and Housing Development of the World
6/7. Revitalising the City and Empowering. Community Tie by the Community (Re) Development in Toyokawa Inari Shrine
Mid-term paper due: proposal of the final project
8/9. Yebisu Garden Place by Guest Lecturer
10. Final Project Interim Presentation and collective review
11/12. Rainbow Town－Tokyo Waterfront Development
13. Independent Desk Crit
14/15. Final presentation by students.
For final project, students will write their own cases based on their research and give presentation at the last class. Final project could be an independent work or group project.

Because this is a samall class and students have different backgrounds and interests, the contens of the class and schdule are subject to change according to her/his disciplines.
This course takes several topics and for each topic lecture is given by instructor and research presentation is given by student assigned to the topic.
It may adopt case method with which students are expected to read cases on various topics regarding emerging risks related to architectural and housing planning, design, and urban development. Students read cases prior to the class and, at the class, they will exchange their ideas face to face in order to develop their original idas to knowledge. It is also expected to develop skills of debating. Instructor will provide appropriate instruction in timely manner for the class discussion along with giving lecture at the class.
1. Introduction
2/3. Architecture after 3.11
4/5. Lecture on Architectural and Housing Development of the World
6/7. Revitalising the City and Empowering. Community Tie by the Community (Re) Development in Toyokawa Inari Shrine

Mid-term paper due: proposal of the final project
8/9. Yebisu Garden Place by Guest Lecturer
10. Final Project Interim Presentation and collective review
11/12. Rainbow Town－Tokyo Waterfront Development
13. Independent Desk Crit
14/15. Final presentation by students.
For final project, students will write their own cases based on their research and give presentation at the last class. Final project could be an independent work or group project.

Because this is a samall class and students have different backgrounds and interests, the contens of the class and schdule are subject to change according to her/his disciplines.

Self Preparation and Review

Related subjects
Architectural/Civil Engineering practice experience preferred but not required.

Architectural/Civil Engineering practice experience preferred but not required.

Notes for textbook
Cases shown above. Cases are subject to change.

(Reference)
TBA
Cases shown above. Cases are subject to change.

(Reference)
TBA

Notes for reference

Goals to be achieved
To understand the needs for srchitecture for humanity that involves various issues includng design, procurement, and distribution systems of architecture from international point of view and from local stabdpoint.
To develop your own ideas and your ability of discussionby the comparative research of your country and Japan.

To understand the needs for srchitecture for humanity that involves various issues includng design, procurement, and distribution systems of architecture from international point of view and from local stabdpoint.
To develop your own ideas and your ability of discussionby the comparative research of your country and Japan.

Evaluation of achievement
Class participation (30%) and final project of case writing (40%) and presentation by the students (30%).
Class participation (30%) and final project of case writing (40%) and presentation by the students (30%).

Examination

Details of examination

Other information
D-707, Phone: 44-6835, Email: shirom@ace.tut.ac.jp
D-707, Phone: 44-6835, Email: shirom@ace.tut.ac.jp

Reference URL

Office hours
Every Tuesday 12:30 to 14:30 on sign-up basis
or by appointment via email
Every Tuesday 12:30 to 14:30 on sign-up basis
or by appointment via email

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Structural System Planning and Design II[Advanced Structural System Planning and Design II]				
Schedule number	M45630200	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Environmental System Planning and Design II[Advanced Environmental System Planning and Design II]				
Schedule number	M45630220	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Regional System Planning and Design II[Advanced Regional System Planning and Design II]				
Schedule number	M45630240	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員, 各教員 5kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

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.

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Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630260)Building and Urban Thermal Environment[Building and Urban Thermal Environment]

Subject name[English]	Building and Urban Thermal Environment[Building and Urban Thermal Environment]				
Schedule number	M45630260	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Wed.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	増田　幸宏 MASUDA Yukihiro				
Numbering					

Objectives of class

Understanding Building/Urban Environmental Engineering to ensure people live and work in a safe, comfortable, efficient, and healthy environmental space.

Understanding Building/Urban Environmental Engineering to ensure people live and work in a safe, comfortable, efficient, and healthy environmental space.

Contents of class

1 Introduction to Course
2 Energy and Buildings
3 Green Buildings
4 Smart Growth
5 Indoor Environments
6 Sustainable City Projects
7 Mid-term Project Researching Report
8 District Energy Supply Systems
9 Building Facility Management
10 Building and Urban Risk Management
11 Urban Heat Island
12 Building and Urban Greenery
13 Urban Thermal Environment and Wind Environment
14 Building and Urban Environmental Infrastructure
15 Individual Presentation Work
16 FINAL EXAM

1 Introduction to Course
2 Energy and Buildings
3 Green Buildings
4 Smart Growth
5 Indoor Environments
6 Sustainable City Projects
7 Mid-term Project Researching Report
8 District Energy Supply Systems
9 Building Facility Management
10 Building and Urban Risk Management
11 Urban Heat Island
12 Building and Urban Greenery
13 Urban Thermal Environment and Wind Environment
14 Building and Urban Environmental Infrastructure
15 Individual Presentation Work
16 FINAL EXAM

Self Preparation and Review

Related subjects

Building Scinece

Building Scinece

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
Short assignments worth 10 points
Project researching report worth 15 points
Individual presentation worth worth 15 points
FINAL EXAM worth 60 points

Short assignments worth 10 points
Project researching report worth 15 points
Individual presentation worth worth 15 points
FINAL EXAM worth 60 points

Examination

Details of examination

Other information
D-711
D-711

Reference URL

Office hours
Thursday

Thursday

Relations to attainment objectives of learning and education

Key words
Energy and Buildings, Sustainable City, Green Buildings, Thermal Environment
Energy and Buildings, Sustainable City, Green Buildings, Thermal Environment

(M45630280)Advanced Architectural Planning[Advanced Architectual Planning]

Subject name[English]	Advanced Architectural Planning[Advanced Architectual Planning]				
Schedule number	M45630280	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	垣野　義典 KAKINO Yoshinori				
Numbering					

Objectives of class

Architectural planning is a basic theory for designing buildings. Fundamentally, The field focused on the functionality and the relationship between people's activities and spaces without an architect's design sense.
Some countries have something like this field (For example, Japanese, America, Sweden, Netherlands, and UK).

社会基盤コースでは、社会基盤施設を計画する場合に、計画するという事は、何を、どのように考えて計画する事なのかを学ぶ。

Architectural planning is a basic theory for designing buildings. Fundamentally, The field focused on the functionality and the relationship between people's activities and spaces without an architect's design sense.
Some countries have something like this field (For example, Japanese, America, Sweden, Netherlands, and UK).

社会基盤コースでは、社会基盤施設を計画する場合に、計画するという事は、何を、どのように考えて計画する事なのかを学ぶ。

Contents of class

1　Guidance, "What is Architectural Planning?"
2　How do we live together ? －　Housing、Collective Housing1
3　How do we live together ? －　Housing、Collective Housing2
4　What is school architecture？ －Toward Church to Educational institute
5　What is school architecture？ Movement of Japan and Europe
6　Nursery and Kindergarten ＋ New cases in Finland
7　What can we do in a library？ + New cases in Finland and Netherlands
8　The development of Hospital
9　Why do we need nursery ？
10　Office －Can architecture support the work style?
11　Theater －　The development of theaters
12　What can we do in a museum？
13　The relationship between Human scale and a body
14　What public place do we use in a city?
15　Summary of Architectural Planning in Jppan

1　Guidance, "What is Architectural Planning?"
2　How do we live together ? －　Housing、Collective Housing1
3　How do we live together ? －　Housing、Collective Housing2
4　What is school architecture？ －Toward Church to Educational institute
5　What is school architecture？ Movement of Japan and Europe
6　Nursery and Kindergarten ＋ New cases in Finland
7　What can we do in a library？ + New cases in Finland and Netherlands
8　The development of Hospital
9　Why do we need nursery ？
10　Office －Can architecture support the work style?
11　Theater －　The development of theaters
12　What can we do in a museum？
13　The relationship between Human scale and a body

14 What public place do we use in a city?
15 Summary of Architectural Planning in Jppan

Self Preparation and Review

Related subjects
計画序論
建築設計演習ⅠからⅥ
建築設計演習基礎

計画序論
建築設計演習ⅠからⅥ
建築設計演習基礎

Notes for textbook
Please refer them(sorry, Japanese only).

建築設計資料集成・総合編・日本建築学会編(丸善、2001 年)
建築設計資料集成・拡張編・集会・市民サービス・日本建築学会編(丸善、2002 年)

Please refer them(sorry, Japanese only).

建築設計資料集成・総合編・日本建築学会編(丸善、2001 年)
建築設計資料集成・拡張編・集会・市民サービス・日本建築学会編(丸善、2002 年)

Notes for reference

Goals to be achieved
Master the basic theory for designing planning of public buildings.
Master the basic theory for designing planning of public buildings.

Evaluation of achievement
Evaluation of performance : some reports
Evaluation of performance : some reports

Examination

Details of examination

Other information
e-mail:y-kakino@ace.tut.ac.jp
Room No. : D-709
e-mail:y-kakino@ace.tut.ac.jp
Room No. : D-709

Reference URL
http://one.world.coocan.jp/
http://one.world.coocan.jp/

Office hours

Relations to attainment objectives of learning and education

Key words
Architectural Planning、space composition、Human life, Culture, Behavior and Activities, function
Architectural Planning、space composition、Human life, Culture, Behavior and Activities, function

(M45630300)Civil Engineering Class[Civil Engineering Class]

Subject name[English]	Civil Engineering Class[Civil Engineering Class]				
Schedule number	M45630300	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	井上 隆信 INOUE Takanobu				
Numbering					

Objectives of class

To know and understand the water pollutants in water environment.
To know and understand Environmental Quality Standards for Water Pollutants in Japan.

To know and understand the water pollutants in water environment.
To know and understand Environmental Quality Standards for Water Pollutants in Japan.

Contents of class

History of Water Pollution in Japan
1) Minamata disease
2) Chronic cadmium poisoning
Environmental Quality Standards for Water Pollutants
1)Environmental Quality Standards for Human Health and Monitored Substances and Guideline Values
2)Environmental Quality Standards for Conservation of the Living Environment

Water pollutants in water environment
1)Nutrients
2)Chemicals in water environment

History of Water Pollution in Japan
1) Minamata disease
2) Chronic cadmium poisoning
Environmental Quality Standards for Water Pollutants
1)Environmental Quality Standards for Human Health and Monitored Substances and Guideline Values
2)Environmental Quality Standards for Conservation of the Living Environment

Water pollutants in water environment
1)Nutrients
2)Chemicals in water environment

Self Preparation and Review

Related subjects

Notes for textbook

No textbook is required for this class.
No textbook is required for this class.

Notes for reference

Goals to be achieved

To understand the water pollution and environmental quality standard.
To understand the water pollution and environmental quality standard.

Evaluation of achievement

Reports

Reports

Examination

Details of examination

Other information

Room : D-811
Tel. : 6852
e-mail : inoue@tutrp.tut.ac.jp

Room : D-811
Tel. : 6852
e-mail : inoue@tutrp.tut.ac.jp

Reference URL

Office hours

Wednesday 12:00- 13:00
Wednesday 12:00- 13:00

Relations to attainment objectives of learning and education

Key words