Syllabus

International Master′s Degree Program

（2012-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.

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

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.

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

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)

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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]	林 孝彦 HAYASHI Takahiko				
Numbering					

Objectives of class

Course Objective: To learn about Japanese society and culture in order to understand Japan and the Japanese

Course Objective: To learn about Japanese society and culture in order to understand Japan and the Japanese

Contents of class

Course Content;「日本事情」(Japanese Life Today):
「日本の社会と文化」(Japanese Society and Culture)

No. 1 Introduction to Japanese Society and Culture
Nature and the Seasons in Japan
No. 2 The Life of the Japanese (Clothing, Food, Housing, Recreation,
Life in the Workplace)
No. 3 Festivals
No. 4 Japanese Culture (Traditional Culture, Contemporary Culture, The
World of Children)
No. 5 Japanese Sports
No. 6 Japanese Education (Part 1)
No. 7 Japanese Education (Part 2)
No. 8 Religion in Japan
Japanese Government
No. 9 The Japanese Economy
Japanese Industry
Transportation System
No.10 Pollution and the Environment (Part 1)
No.11 Pollution and the Environment (Part 2)
No.12 Japanese History (Part 1)
No.13 Japanese History (Part 2)
No.14 Other issues about Japanese Society and Culture (Part 1)
No.15 Other issues about Japanese Society and Culture (Part 2)

This course is taught in English. There will be limited Japanese language support.

Course Content;「日本事情」(Japanese Life Today):
「日本の社会と文化」(Japanese Society and Culture)

No. 1 Introduction to Japanese Society and Culture
Nature and the Seasons in Japan
No. 2 The Life of the Japanese (Clothing, Food, Housing, Recreation,
Life in the Workplace)
No. 3 Festivals
No. 4 Japanese Culture (Traditional Culture, Contemporary Culture, The
World of Children)
No. 5 Japanese Sports
No. 6 Japanese Education (Part 1)
No. 7 Japanese Education (Part 2)
No. 8 Religion in Japan
Japanese Government

No. 9 The Japanese Economy
Japanese Industry
Transportation System
No.10 Pollution and the Environment (Part 1)
No.11 Pollution and the Environment (Part 2)
No.12 Japanese History (Part 1)
No.13 Japanese History (Part 2)
No.14 Other issues about Japanese Society and Culture (Part 1)
No.15 Other issues about Japanese Society and Culture (Part 2)

This course is taught in English. There will be limited Japanese language support.

Self Preparation and Review

Related subjects
Related Courses:
Japanese Cultural Review, Language and Culture, Language and Society, etc.
Prerequisite:
Students must be able to read in English or Japanese.

Related Courses:
Japanese Cultural Review, Language and Culture, Language and Society, etc.
Prerequisite:
Students must be able to read in English or Japanese.

Notes for textbook
Textbook:
「日本タテヨコ(JAPAN AS IT IS) (FOURTH EDITION)」(学習研究社)(Published by Gakken)
Reference Books:
THE JAPAN BOOK Published by Kodansha International
「日本事情入門」(View of Today's Japan) アルク 編 (Edited by ALC)、佐々木瑞枝 著 (Written by Mizue Sasaki) (アルク) (Published by ALC)
An Introduction to Japanese Society Second Edition (Series: Contemporary Japanese Society) Written by Yoshio Sugimoto, Published by Cambridge University Press
Transcending Stereotypes: Discovering Japanese Culture and Education Edited by Barbara Finkelstein, Anne E. Imamura, Joseph J. Tobin, Published by Intercultural Press
Inside the Japanese System: Readings on Contemporary Society and Political Economy Edited by Daniel Okimoto, Thomas Rohlen, Published by Stanford University Press
「英語で話す「日本の文化」Japan as I See It」 NHK 国際局文化プロジェクト 編 (Edited by NHK Overseas Broadcasting Department)、ダン・ケニー 訳 (Translated by Don Kenny) (講談社インターナショナル)(Published by Kodansha International)
「日本事情(第2版)JAPAN A LA CARTE」 佐々木瑞枝 著 (Written by Mizue Sasaki) (北星堂)(Published by The Hokuseido Press)

Textbook:
「日本タテヨコ(JAPAN AS IT IS) (FOURTH EDITION)」(学習研究社)(Published by Gakken)
Reference Books:
THE JAPAN BOOK Published by Kodansha International
「日本事情入門」(View of Today's Japan) アルク 編 (Edited by ALC)、佐々木瑞枝 著 (Written by Mizue Sasaki) (アルク) (Published by ALC)
An Introduction to Japanese Society Second Edition (Series: Contemporary Japanese Society) Written by Yoshio Sugimoto, Published by Cambridge University Press
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Notes for reference

Goals to be achieved

Learning Goals:
(1) To understand Japanese society and culture
(2) To understand the background of modern Japanese life

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(1) To understand Japanese society and culture
(2) To understand the background of modern Japanese life

Evaluation of achievement

Grading:
In-class reports: 30%
Final report: 50%
Class participation and presentations: 20%
In-class reports must be written in English. The final report can be written in English or Japanese.

Grading:
In-class reports: 30%
Final report: 50%
Class participation and presentations: 20%
In-class reports must be written in English. The final report can be written in English or Japanese.

Examination

Details of examination

Other information

Office: 国際交流センター (Center for International Relations) 相談室 (Consulting Room)
Telephone: 0532-44-6866 (Extension: 6866)
E-mail: hayashi@las.tut.ac.jp

Office: 国際交流センター (Center for International Relations) 相談室 (Consulting Room)
Telephone: 0532-44-6866 (Extension: 6866)
E-mail: hayashi@las.tut.ac.jp

Reference URL

Office hours

Office Hours:
Anytime during regular working hours

Office Hours:
Anytime during regular working hours

Relations to attainment objectives of learning and education

Key words

日本 (Japan)、社会 (society)、文化 (culture)

日本 (Japan)、社会 (society)、文化 (culture)

(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.

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.

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

This class has the following three parts.

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

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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

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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
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**	Intensive	**Credit(s)**	6
Faculty	Graduate School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S1系教務委員 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.

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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 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**	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.

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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 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

(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]	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

(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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
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

(M41630010)Vibration and Impact Mechanics[Vibration and Impact Mechanics]

Subject name[English]	Vibration and Impact Mechanics[Vibration and Impact Mechanics]				
Schedule number	M41630010	**Subject area**	Advanced Mechanical Engineering	**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]	河村　庄造 KAWAMURA Shozo				
Numbering					

Objectives of class

The class aims to give basic knowledge on vibration engineering, in particular, on the modeling of multi-degree-of-freedom system and modal analysis, and contact, impact and some of their analytical methods.

The class aims to give basic knowledge on vibration engineering, in particular, on the modeling of multi-degree-of-freedom system and modal analysis, and contact, impact and some of their analytical methods.

Contents of class

Vibration Engineering(Kawamura)
1. Modeling of multi-degree-of-freedom system(MDOF system)
2. Modal analysis of MDOF system (eigenvalue analysis, etc.)
3. Modal analysis of MDOF system (Component mode synthesis method)

Impact Mechanics(Minamoto)
1.Rigid body impact
Collinear impact of spheres, Impulse-momentum relation, Coefficient of restitution
2.Contact of elastic body
Hertz theory of contact, Contact pressure, Contact between two spheres, Boussinesq problem
3.Elastic and inelastic impact
Hertz theory of impact, Contact duration, Impact between two spheres
Initiation of yielding, Fully plastic deformation, Coefficient of restitution
4.Axial impact
Wave propagation, Longitudinal wave, Split Hopkinson-bar test

Vibration Engineering(Kawamura)
1. Modeling of multi-degree-of-freedom system(MDOF system)
2. Modal analysis of MDOF system (eigenvalue analysis, etc.)
3. Modal analysis of MDOF system (Component mode synthesis method)

Impact Mechanics(Minamoto)
1.Rigid body impact
Collinear impact of spheres, Impulse-momentum relation, Coefficient of restitution
2.Contact of elastic body
Hertz theory of contact, Contact pressure, Contact between two spheres, Boussinesq problem
3.Elastic and inelastic impact
Hertz theory of impact, Contact duration, Impact between two spheres
Initiation of yielding, Fully plastic deformation, Coefficient of restitution
4.Axial impact
Wave propagation, Longitudinal wave, Split Hopkinson-bar test

Self Preparation and Review

Related subjects

Fundamental knowledge on vibration engineering and mathematics on linear algebra and ordinary differential equation, and

engineering mechanics, theory of elasticity and plasticity.

Fundamental knowledge on vibration engineering and mathematics on linear algebra and ordinary differential equation, and engineering mechanics, theory of elasticity and plasticity.

Notes for textbook

Handouts will be prepared

Handouts will be prepared

Notes for reference

Goals to be achieved

get the basic knowledge on vibration engineering, contact, impact and some of their analytical methods.

get the basic knowledge on vibration engineering, contact, impact and some of their analytical methods.

Evaluation of achievement

Some short reports during the class (30%) and a comprehensive report after final class (70%)

Some short reports during the class (30%) and a comprehensive report after final class (70%)

Examination

Details of examination

Other information

Shozo Kawamura: room (D-404), E-Mail: kawamura@me.tut.ac.jp
Hirofumi Minamoto: room (D-405), e-mail: minamoto@me.tut.ac.jp

Shozo Kawamura: room (D-404), E-Mail: kawamura@me.tut.ac.jp
Hirofumi Minamoto: room (D-405), e-mail: minamoto@me.tut.ac.jp

Reference URL

Office hours

ask me by E-Mail

ask me by E-Mail

Relations to attainment objectives of learning and education

Key words

vibration, impact, contact

vibration, impact, contact

(M41630070)Joining and Surfacing of Materials[Joining and Surfacing of Materials]

Subject name[English]	Joining and Surfacing of Materials[Joining and Surfacing of Materials]				
Schedule number	M41630070	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.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]	福本　昌宏 FUKUMOTO Masahiro				
Numbering					

Objectives of class

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

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

Contents of class

1. Fundamental of surface modification process and technology
2. Fundamentals of thermal spray process, Splat formation problem
3. Process control with Transition temperature & Transition pressure
4. Cold spraying and Aero-sol deposition process, Functional materials coating: photocatalyst, SOFC, nano coating, intermetallic compound coating, etc.
5. Fundamental of Friction Stir Welding
6. Joining between disimillar materials by FSW
7. Friction spot welding, practical applications of FSW

1. Fundamental of surface modification process and technology
2. Fundamentals of thermal spray process, Splat formation problem
3. Process control with Transition temperature & Transition pressure
4. Cold spraying and Aero-sol deposition process, Functional materials coating: photocatalyst, SOFC, nano coating, intermetallic compound coating, etc.
5. Fundamental of Friction Stir Welding
6. Joining between disimillar materials by FSW
7. Friction spot welding, practical applications of FSW

Self Preparation and Review

Related subjects

Basic knowledge on materials joining process is desirable.

Basic knowledge on materials joining process is desirable.

Notes for textbook

Handouts will be prepared for participants.
(Reference)
Required readings will be taken from a variety of reference books and research papers.

Handouts will be prepared for participants.
(Reference)
Required readings will be taken from a variety of reference books and research papers.

Notes for reference

Goals to be achieved

Understand following items,
-Joining mechanism between dissimilar materials
-Features and mechanism of various joining methods
-Features and mechanism of thick and thin film coating
-Features of functionally gradient material and composite material

Understand following items,
-Joining mechanism between dissimilar materials
-Features and mechanism of various joining methods
-Features and mechanism of thick and thin film coating

-Features of functionally gradient material and composite material

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Masahiro Fukumoto:

Room: D-503, ext.: 6692, e-mail: fukumoto@tut.jp

Masahiro Fukumoto:

Room: D-503, ext.: 6692, e-mail: fukumoto@tut.jp

Reference URL

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

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

Office hours

Masahiro Fukumoto: Wednesday 17:00-18:00

Masahiro Fukumoto: Wednesday 17:00-18:00

Relations to attainment objectives of learning and education

Key words

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

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

(M41630130)Modeling and Analysis of Dynamical Control Systems[Modeling and Analysis of Dynamical Control Systems]

Subject name[English]	Modeling and Analysis of Dynamical Control Systems[Modeling and Analysis of Dynamical Control Systems]				
Schedule number	M41630130	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	寺嶋　一彦 TERASHIMA Kazuhiko				
Numbering					

Objectives of class

Modeling and Analysis of dynamical control systems is lectured.In particular, physical modeling of various processes is explained and identification method is also explained by means of experiment data and information technique when physical modeling is impossible. Then, analysis of systems is lectured concerning state vector equation, solution, controllability , observability, staility and realization. Modeling is very important engineering for control design, and is indispensable to become advanced engineer.

Modeling and Analysis of dynamical control systems is lectured.In particular, physical modeling of various processes is explained and identification method is also explained by means of experiment data and information technique when physical modeling is impossible. Then, analysis of systems is lectured concerning state vector equation, solution, controllability , observability, staility and realization. Modeling is very important engineering for control design, and is indispensable to become advanced engineer.

Contents of class

1.Physical Modeling
(1) Process system
(2)Mechanical system
(3) Electric system
2.System Identification of Linear Systems
(1) Time series model such as ARMA model and ARX model
(2) Time series identification by Least square method
(3) Transfer function identification by FFT
(4) Realization problem
3.System Identification of Nonlinear Systems
(1)Neural network modeling
(2)Fuzzy modeling
4.System Analysis
(1)State vector equation and analytical solution of system
(2)Controllability and Observability of system
(3)Stability of systems

1.Physical Modeling
(1) Process system
(2)Mechanical system
(3) Electric system
2.System Identification of Linear Systems
(1) Time series model such as ARMA model and ARX model
(2) Time series identification by Least square method
(3) Transfer function identification by FFT
(4) Realization problem
3.System Identification of Nonlinear Systems
(1)Neural network modeling
(2)Fuzzy modeling
4.System Analysis
(1)State vector equation and analytical solution of system
(2)Controllability and Observability of system
(3)Stability of systems

Self Preparation and Review

Related subjects
Mathematical ability for Matrix theory and Laplace transformation
Mathematical ability for Matrix theory and Laplace transformation

Notes for textbook
Print prepared by lecturer

(Reference)
Modern control design with MATLAB and SIMLINK by　Ashish Tewari, Wiley
Print prepared by lecturer

(Reference)
Modern control design with MATLAB and SIMLINK by　Ashish Tewari, Wiley

Notes for reference

Goals to be achieved
We study and　understand how to build the mathmatical model in order to predict and control the natural phenomena and the real processes.
We study and　understand how to build the mathmatical model in order to predict and control the natural phenomena and the real processes.

Evaluation of achievement
Test: 90, Report 10
Test: 90, Report 10

Examination

Details of examination

Other information
Email address: terasima@me.tut.ac.jp
Email address: terasima@me.tut.ac.jp

Reference URL
http://www.syscon.pse.tut.ac.jp/
http://www.syscon.pse.tut.ac.jp/

Office hours
Wed.13:00-15:00

Wed.13:00-15:00

Relations to attainment objectives of learning and education

Key words

(M41630200)Advanced Environmental Engineering for Metals[Advanced Environmental Engineering for Metals]

Subject name[English]	Advanced Environmental Engineering for Metals[Advanced Environmental Engineering for Metals]				
Schedule number	M41630200	**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**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	横山　誠二 YOKOYAMA Seiji				
Numbering					

Objectives of class

"Advanced Environmental Engineering for Metals" includes physical chmistry and transport phenomena for environment. In this course students will learn about fundamentals of physical chemistry of metals mainly in metallurgical processing, such as recycling, reaction between gaseous spcies and metals. Focus is put on molten metals. Class will be given in a seminar style.
"Advanced Environmental Engineering for Metals" includes physical chmistry and transport phenomena for environment. In this course students will learn about fundamentals of physical chemistry of metals mainly in metallurgical processing, such as recycling, reaction between gaseous spcies and metals. Focus is put on molten metals. Class will be given in a seminar style.

Contents of class

1.Introduction.
2.Fundamentals of recycling of metals
2.1. Thermochemistry (Fundamentals of Evaporation)
3. 2.2. Thermochemistry (Activity and chemical equilibrium between two phases)
4. 2.3. Reaction Kinetics (Chemical reaction rate and Diffusion)
5. 2.4. Reaction between gas species and metals
6. 3. Application
3.1. Recycling of viecle (Material recycling)
7.Recyclling of by-product in iron and steelmaking (Slag and dust)
8. Exam.
1.Introduction.
2.Fundamentals of recycling of metals
2.1. Thermochemistry (Fundamentals of Evaporation)
3. 2.2. Thermochemistry (Activity and chemical equilibrium between two phases)
4. 2.3. Reaction Kinetics (Chemical reaction rate and Diffusion)
5. 2.4. Reaction between gas species and metals
6. 3. Application
3.1. Recycling of viecle (Material recycling)
7.Recyclling of by-product in iron and steelmaking (Slag and dust)
8. Exam.

Self Preparation and Review

Related subjects

Basic knowledge of Chemical physics, transport phenomena, chemical reaction rate.
Basic knowledge of Chemical physics, transport phenomena, chemical reaction rate.

Notes for textbook

＜Reference＞
"Principles of Extractive Metallurgy", Terkel Rosenqvist(McGrowhill)

＜Reference＞
"Principles of Extractive Metallurgy", Terkel Rosenqvist(McGrowhill)

Notes for reference

Goals to be achieved

To understand
1) Chemical equilibrium

2) Reaction rate
3) Transport phenomena
4) Evaporation
5) liquid-liquid extraction
6) Recycling of viecle
To understand
1) Chemical equilibrium
2) Reaction rate
3) Transport phenomena
4) Evaporation
5) liquid-liquid extraction
6) Recycling of viecle

Evaluation of achievement

Evaluation: Score calculated from report (50 %) and exam. (50 %)
(you must submit all reports)
A：You must understand all items as listed above, and you ger score of 80 and above.
B：You must understand four of all items as listed above, and you ger score of 65 and above.
C：You must understand four of all items as listed above, and you ger score of 55 and above.
Evaluation: Score calculated from report (50 %) and exam. (50 %)
(you must submit all reports)
A：You must understand all items as listed above, and you ger score of 80 and above.
B：You must understand four of all items as listed above, and you ger score of 65 and above.
C：You must understand four of all items as listed above, and you ger score of 55 and above.

Examination

Details of examination

Other information

D-507
TEL:0532-44-6696
E-mail:yokoyama@me.tut.ac.jp
D-507
TEL:0532-44-6696
E-mail:yokoyama@me.tut.ac.jp

Reference URL

http://martens.pse.tut.ac.jp/
http://martens.pse.tut.ac.jp/

Office hours

Monday 16:00-18:00
Monday 16:00-18:00

Relations to attainment objectives of learning and education

Key words

equilibrium, matallurgy, kinetics, diffusion, high temperature
equilibrium, matallurgy, kinetics, diffusion, high temperature

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

Subject name[English]	Advanced Mechanical Systems Design II[Advanced Mechanical Systems Design II]				
Schedule number	M41630220	**Subject area**	Advanced Mechanical 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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

This lecture aims to provide a broad understanding of the mechanical systems design 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

(M41630240)Advanced Materials and Manufacturing Process II[Advanced Materials and Manufacturing Process II]

Subject name[English]	Advanced Materials and Manufacturing Process II[Advanced Materials and Manufacturing Process II]				
Schedule number	M41630240	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

This lecture aims to provide a broad understanding of the materials and manufacturing process 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

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

Subject name[English]	Advanced System, Control and Robotics II[Advanced System, Control and Robotics II]				
Schedule number	M41630260	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

This lecture aims to provide a broad understanding of the control and robotics 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

(M41630280)Advanced Energy and Environmental Engineering II[Advanced Energy and Environmental Engineering II]

Subject name[English]	Advanced Energy and Environmental Engineering II[Advanced Energy and Environmental Engineering II]				
Schedule number	M41630280	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Fri.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]	各教員, S1系教務委員 KAKUKYOUIN Kakukyouin, 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

This lecture aims to provide a broad understanding of the energy and environmental 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

(M42610010)Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610010	**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)**	3
Faculty	Graduate School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

The seminar aims to provide a broad understanding of theoretical and experimental approoches related to the electrical and electronic information engineering for the research work of his/her master thesis.

The seminar aims to provide a broad understanding of theoretical and experimental approoches related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

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

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

(M42610010)Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610010	**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)**	3
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 seminar aims to provide a broad understanding of theoretical and experimental approoches related to the electrical and electronic engineering for the research work of his/her master thesis.

The seminar aims to provide a broad understanding of theoretical and experimental approoches related to the electrical and electronic engineering for the research work of his/her master thesis.

Contents of class

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

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

(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 School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

(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

(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 and spin electronics and 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 and spin electronics and 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 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 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

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 and spin electronics

functional materials, photonics and spin electronics

(M42630080)Advanced Electronic Information System[Advanced Electronic Information System]

Subject name[English]	Advanced Electronic Information System[Advanced Electronic Information System]				
Schedule number	M42630080	**Subject area**	Advanced Electrical and Electronic Information 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]	市川 周一 ICHIKAWA Shuichi				
Numbering					

Objectives of class

The aims of this lecture:
(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand various designs for computer arithmetic units.

The aims of this lecture:
(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand various designs for computer arithmetic units.

Contents of class

Algorithm is a procedure for solving a mathematical problem in a finite number of steps. The required calculation time and memory space depend on the algorithm, even for the same problem. Thus, it is essential to select the best algorithm for a given set of conditions.

In digital hardware, an algorithm is realized as a logic design. This lecture aims to understand various hardware algorithms for computer arithmetic, together with the corresponding designs of arithmetic hardware.

Week 1: Introduction
Week 2, 3: Algorithms for addition
Week 4,5,6: Algorithms for multiplication
Week 7,8,9: Algorithms for division and square root
Week 10,11: Algorithms for elementary functions
Week 12: Floating-point arithmetic
Week 13: Pipelining
Week 14, 15: Custom computing hardware

Algorithm is a procedure for solving a mathematical problem in a finite number of steps. The required calculation time and memory space depend on the algorithm, even for the same problem. Thus, it is essential to select the best algorithm for a given set of conditions.

In digital hardware, an algorithm is realized as a logic design. This lecture aims to understand various hardware algorithms for computer arithmetic, together with the corresponding designs of arithmetic hardware.

Week 1: Introduction
Week 2, 3: Algorithms for addition
Week 4,5,6: Algorithms for multiplication
Week 7,8,9: Algorithms for division and square root
Week 10,11: Algorithms for elementary functions
Week 12: Floating-point arithmetic
Week 13: Pipelining
Week 14, 15: Custom computing hardware

Self Preparation and Review

Related subjects
Prerequisite:
Fundamental knowledge and skills of logic design, algorithms, and computer structure.

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

Notes for textbook
The lecturer will provide the handouts of slides.
References are given for each topic whenever necessary.

The lecturer will provide the handouts of slides.
References are given for each topic whenever necessary.

Notes for reference

Goals to be achieved
(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand various designs for computer arithmetic units.

(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand various designs for computer arithmetic units.

Evaluation of achievement
Reports on specific items given in the lecture (50%).
Term examination on general items shown in the lecture (50%).

Reports on specific items given in the lecture (50%).
Term examination on general items shown in the lecture (50%).

Examination

Details of examination

Other information
Room F-506
ext. 6897
E-mail: ichikawa@tut.jp

Room F-506
ext. 6897
E-mail: ichikawa@tut.jp

Reference URL
http://meta.tutkie.tut.ac.jp/~ichikawa/lecture/
http://meta.tutkie.tut.ac.jp/~ichikawa/lecture/

Office hours
Please make an appointment for consultation with the lecturer via e-mail or direct communication in classroom.
Please make an appointment for consultation with the lecturer via e-mail or direct communication in classroom.

Relations to attainment objectives of learning and education

Key words

(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]	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 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]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
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**	Intensive	**Credit(s)**	6
Faculty	Graduate School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員 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.

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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**	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.
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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

(M43630010)Technical English Presentation[Technical English Presentation]

Subject name[English]	Technical English Presentation[Technical English Presentation]				
Schedule number	M43630010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Year	**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]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
Numbering					

Objectives of class

The aim of this course is to allow the student to achieve a level of success and ability whereby he or she will be able to effectively perform technical English reading, writing, speaking and listening tasks.

The aim of this course is to allow the student to achieve a level of success and ability whereby he or she will be able to effectively perform technical English reading, writing, speaking and listening tasks.

Contents of class

Content: Each class session will consist of a set number of textbook pages, listening and dictation exercises, and daily in-class vocabulary building assigned by the instructor.

Procedure:Each of the lessons are vocabulary based, with increasing levels of difficulty, and have a set of language functions that are commonly used in a 'real-life' format. Each class will consist of a set number of textbook pages, listening and dictation exercises, and in-class activities.

Content: Each class session will consist of a set number of textbook pages, listening and dictation exercises, and daily in-class vocabulary building assigned by the instructor.

Procedure:Each of the lessons are vocabulary based, with increasing levels of difficulty, and have a set of language functions that are commonly used in a 'real-life' format. Each class will consist of a set number of textbook pages, listening and dictation exercises, and in-class activities.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

At the end of one year, the student should be able to successfully communicate in a set of 'real life' functions and to attractively present his/her own's research topic.

At the end of one year, the student should be able to successfully communicate in a set of 'real life' functions and to attractively present his/her own's research topic.

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

B-1F Part time lecture room

B-1F Part time lecture room

Reference URL

Office hours Before and after lecture Before and after lecture
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 ～ 5,Fri.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]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
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

(M43630030)Speech and Language Processing[Speech and Language Processing]

Subject name[English]	Speech and Language Processing[Speech and Language Processing]				
Schedule number	M43630030	**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

(M43630060)Web Data Engineering[Web Data Engineering]

Subject name[English]	Web Data Engineering[Web Data Engineering]				
Schedule number	M43630060	**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]	青野 雅樹, 栗山 繁 AONO Masaki, KURIYAMA Shigeru				
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.
2. Information Visualization for massive data (Part II)
Mainly focuses on graphical models and visualization methods for handling multi-variable data
3. Construction of Web-based data service systems (Part III)
Mainly focuses on Web programming methodologies through exercises
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.
2. Information Visualization for massive data (Part II)
Mainly focuses on graphical models and visualization methods for handling multi-variable data
3. Construction of Web-based data service systems (Part III)
Mainly focuses on Web programming methodologies through exercises

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) S. Chakrabati, Mining the Web, Morgan Kaufmann (2) Colin Ware, Information Visualization: Perception for Design, Morgan Kaufmann
Materials will be prepared by lecturers
References:
(1) S. Chakrabati, Mining the Web, Morgan Kaufmann (2) 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) reports (50%) and exercise & presentation (50%)
(Part I & Part III , Aono) exercise (20%), presentation (40%), and final exam (40%)
(Part II & Part III , Kuriyama) reports (50%) and exercise & presentation (50%)

Examination

Details of examination

Other information

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

Reference URL

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

Office hours

Anytime.
Anytime.

Relations to attainment objectives of learning and education

Capability of designing Web application systems.

Capability of designing Web application systems.

Key words

(M43630080)Computers and Education[Computers and Education]

Subject name[English]	Computers and Education[Computers and Education]				
Schedule number	M43630080	**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]	河合　和久 KAWAI Kazuhisa				
Numbering					

Objectives of class

The Purpose of the class is to deepen and broaden students' knowledge of their own expertise in relation to the society.
The Purpose of the class is to deepen and broaden students' knowledge of their own expertise in relation to the society.

Contents of class

Students will be offered some overviews of computers and education. Students will give some presentations on the following problems: (1) to make the teaching plan of their own research subjects for pupils or junior high school students, (2) to make a simulated class based on the plan, (3) to discuss the simulated class. At the end of term, students are required to submit an essay on computers and education.

1.Guidance, Lecture#1(Introduction to subject "Information".)
2.Lecture#2(Computer system for education. and Software as course material.)
3.Lecture#3(Cooperation with the period of integrated study.)
4.Lecture#4(Simulated class: plan and evaluation.)
5.Lecture#5(Keep an "Information" teacher. and Teaching plan.)
6.Lecture#6(Information sending and presentation.)
7.Lecture#7(Group work by collaboration and presentation.)
8.Lecture#8(Media literacy., Information ethics education. and Network.)
9.Presentations of Teaching Plans #1
10.Presentations of Teaching Plans #2
11.Lecture#9(Expression of information and multimedia. and Topics in information society.)
12.Lecture#10(Algorithm and programming. and Information retrieval and database.)
13.Simulated Classes #1
14.Simulated Classes #2
15.Simulated Classes #3
16.Presentations of Final Reports

Students will be offered some overviews of computers and education. Students will give some presentations on the following problems: (1) to make the teaching plan of their own research subjects for pupils or junior high school students, (2) to make a simulated class based on the plan, (3) to discuss the simulated class. At the end of term, students are required to submit an essay on computers and education.

1.Guidance, Lecture#1(Introduction to subject "Information".)
2.Lecture#2(Computer system for education. and Software as course material.)
3.Lecture#3(Cooperation with the period of integrated study.)
4.Lecture#4(Simulated class: plan and evaluation.)
5.Lecture#5(Keep an "Information" teacher. and Teaching plan.)
6.Lecture#6(Information sending and presentation.)
7.Lecture#7(Group work by collaboration and presentation.)
8.Lecture#8(Media literacy., Information ethics education. and Network.)
9.Presentations of Teaching Plans #1
10.Presentations of Teaching Plans #2
11.Lecture#9(Expression of information and multimedia. and Topics in information society.)
12.Lecture#10(Algorithm and programming. and Information retrieval and database.)
13.Simulated Classes #1
14.Simulated Classes #2
15.Simulated Classes #3

16.Presentations of Final Reports

Self Preparation and Review

Related subjects
Basic skills on information and communication technologies are required.
Basic skills on information and communication technologies are required.

Notes for textbook
(Reference) H. Ohiwa, et.al.: "JOUHOUKA KYOUIKUHOU", Ohm Sha, in Japanese.

(Reference) H. Ohiwa, et.al.: "JOUHOUKA KYOUIKUHOU", Ohm Sha, in Japanese.

Notes for reference

Goals to be achieved

Evaluation of achievement
Written reports 50%, In class work 50%.
Written reports 50%, In class work 50%.

Examination

Details of examination

Other information
Room: F1-206.
E-Mail: kawai@tut.jp

Room: F1-206.
E-Mail: kawai@tut.jp

Reference URL
http://www.ita.cs.tut.ac.jp/~kawai/kpe/ (Some pages are written in Japanese.)
http://www.ita.cs.tut.ac.jp/~kawai/kpe/ (Some pages are written in Japanese.)

Office hours
Office hours; Wednesday 2nd period and Friday 2nd period in Room F1-206.
Office hours; Wednesday 2nd period and Friday 2nd period in Room F1-206.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Image Processing, Advanced[Image Processing, Advanced]				
Schedule number	M43630100	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	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]	金澤 靖 KANAZAWA Yasushi				
Numbering					

Objectives of class

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

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

Contents of class

- Fundamentals on projective geometry
- Camera model
- Epipolar geometry
- 3-D reconstruction from two views
- 3-D reconstruction from many views
- Advanced issues

- Fundamentals on projective geometry
- Camera model
- Epipolar geometry
- 3-D reconstruction from two views
- 3-D reconstruction from many views
- Advanced issues

Self Preparation and Review

Related subjects

Geometry, Linear Algebra, Statistics.

Geometry, Linear Algebra, Statistics.

Notes for textbook

Handouts will be prepared.

(References)

- R.I. Hartley and A. Zisserman, Multiple View Geometry in Computer Vision, Cambridge University Press, 2000.
- D.A. Forsyth and J. Ponce, Computer Vision -- A Modern Approach --, Prentice Hall, 2003.

Handouts will be prepared.

(References)

- R.I. Hartley and A. Zisserman, Multiple View Geometry in Computer Vision, Cambridge University Press, 2000.
- D.A. Forsyth and J. Ponce, Computer Vision -- A Modern Approach --, Prentice Hall, 2003.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Grade will be determined by some reports for each area.

Grade will be determined by some reports for each area.

Examination

Details of examination

Other information

Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa)

Room F-404, Ext. 6888, Email: kanazawa@cs.tut.ac.jp (Yasushi Kanazawa)

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

image processing, computer vision

image processing, computer vision

(M43630110)High Performance Computing[High Performance Computing]

Subject name[English]	High Performance Computing[High Performance Computing]				
Schedule number	M43630110	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	後藤　仁志 GOTO Hitoshi				
Numbering					

Objectives of class

This lecture aims to lean the basic concepts and recent developments related to high-performance and cloud computing, simulation science and technology, and especially, to master parallel programming techniques for multi-core processor system and high-performance computing. Recent topics on computational chemistry will be also introduced for well-understanding the current technology of supercomputer and supercomputing. In order to conduct a practical training course on parallel programming techniques of OpenMP and OpenMPI, knowledge and ability to mathematical scientific programming techniques by using Fortran 90/95/2000 and/or C/C++ must be required for students taking this lecture.

This lecture aims to lean the basic concepts and recent developments related to high-performance and cloud computing, simulation science and technology, and especially, to master parallel programming techniques for multi-core processor system and high-performance computing. Recent topics on computational chemistry will be also introduced for well-understanding the current technology of supercomputer and supercomputing. In order to conduct a practical training course on parallel programming techniques of OpenMP and OpenMPI, knowledge and ability to mathematical scientific programming techniques by using Fortran 90/95/2000 and/or C/C++ must be required for students taking this lecture.

Contents of class

1. Guidance and placement examination
2. Introduction to simulation science: What's simulation?
3- 5. Partial differential equation of motion, pendulum, mechanical vibration and thier coupled (combined) behaviors
6. Introduction to molecular simulations
7- 9. Practical training of molecular simulations
10. Introduction to parallel programming (OpenMP and OpenMPI) and programming language (Fortran90/95/2000)
11-13. Practical training of parallel programming (practical beginner's guide)
14-16. Practical training of parallel programming (Intel(R) Compilers)

1. Guidance and placement examination
2. Introduction to simulation science: What's simulation?
3- 5. Partial differential equation of motion, pendulum, mechanical vibration and thier coupled (combined) behaviors
6. Introduction to molecular simulations
7- 9. Practical training of molecular simulations
10. Introduction to parallel programming (OpenMP and OpenMPI) and programming language (Fortran90/95/2000)
11-13. Practical training of parallel programming (practical beginner's guide)
14-16. Practical training of parallel programming (Intel(R) Compilers)

Self Preparation and Review

Related subjects

Fundamental knowledge of computation and chemistry, and also basic ability to scientific programming techniques by using Fortran 90/95/2000 and/or C/C++

Fundamental knowledge of computation and chemistry, and also basic ability to scientific programming techniques by using Fortran 90/95/2000 and/or C/C++

Notes for textbook

None

None

Notes for reference

Goals to be achieved

Advanced knowledge of simulation science, especially molecular simulations and high-level ability of programming technique in mathematics and science Advanced knowledge of simulation science, especially molecular simulations and high-level ability of programming technique in mathematics and science
Evaluation of achievement Reports on various topics and assignments Reports on various topics and assignments
Examination
Details of examination
Other information via E-mail (gotoh@tut.jp) via E-mail (gotoh@tut.jp)
Reference URL
Office hours via E-mail(gotoh@tut.jp) via E-mail(gotoh@tut.jp)
Relations to attainment objectives of learning and education None None
Key words Computer Simulation, Computational Mathematics, Computational Physics,Computational Chemistry, Supercomputer, Mathematical Science Computer Simulation, Computational Mathematics, Computational Physics,Computational Chemistry, Supercomputer, Mathematical Science

(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.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]	関野 秀男, 栗田 典之 SEKINO Hideo, KURITA Noriyuki				
Numbering					

Objectives of class

Understanding of theories for molecular science and simulation technology based upon it
Understanding of theories for molecular science and simulation technology based upon it

Contents of class

1. Fundamental notion of quantum mechanics
i) Philosophical aspect
ii) Pragmatical aspect
2. Differential equations for quantum mechanical problems
i) Free particle
ii) Confined particle
iii) Multidimensional problems
3. Molecular orbital theory
i) Representation of physical space
ii) Spectral representation of space/ Basis functions
4. Approximate theory for many electron systems
i) Many particle problem in confined systems
ii) Rigor and precision
iii) Computational aspect

1. Fundamental notion of quantum mechanics
i) Philosophical aspect
ii) Pragmatical aspect
2. Differential equations for quantum mechanical problems
i) Free particle
ii) Confined particle
iii) Multidimensional problems
3. Molecular orbital theory
i) Representation of physical space
ii) Spectral representation of space/ Basis functions
4. Approximate theory for many electron systems
i) Many particle problem in confined systems
ii) Rigor and precision
iii) Computational aspect

Self Preparation and Review

Related subjects

Notes for textbook

1)Quantum chemistry
Eyring/Walter/Kimball

2)Modern Quantum Chemistry
Introduction to Advanced Electron Structure Theory
A.Szabo and N.S.Ostlund

1)Quantum chemistry
Eyring/Walter/Kimball

2)Modern Quantum Chemistry
Introduction to Advanced Electron Structure Theory
A.Szabo and N.S.Ostlund

Notes for reference

Goals to be achieved

To understand quantum mechanics, Molecuar quantum mechanics and its numerical representation on computer.
To understand quantum mechanics, Molecuar quantum mechanics and its numerical representation on computer.

Evaluation of achievement

Presentation in the class and reports, small tests(several times) as well as creation of simulation programs.
Presentation in the class and reports, small tests(several times) as well as creation of simulation programs.

Examination

Details of examination

Other information

F-305
0532-44-6880
F-305
0532-44-6880

Reference URL

Office hours

Wed. 13:00 to 14:30
Wed. 13:00 to 14:30

Relations to attainment objectives of learning and education

Key words

Molecular Orbital Theory　Differential Equation
Molecular Orbital Theory　Differential Equation

(M43630190)Bio-physical Information Systems[Bio-physical Information Systems]

Subject name[English]	Bio-physical Information Systems[Bio-physical Information Systems]				
Schedule number	M43630190	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Fri.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]	堀川 順生, 福村 直博 HORIKAWA Junsei, FUKUMURA Naohiro				
Numbering					

Objectives of class

This course lectures on information processing in the nervous system of animals and humans and neural network models. Information processing in the sensory and motor systems and computational models for motor controls including neuron models, perceptron and machine learning, are studied.

This course lectures on information processing in the nervous system of animals and humans and neural network models. Information processing in the sensory and motor systems and computational models for motor controls including neuron models, perceptron and machine learning, are studied.

Contents of class

(Fukumura)
1. Introduction to the computational neuroscience in the motor control system
2. Neuron models and simple perceptron
3. Multi-layered perceptron
4. Reinforcement learning
5. Information processing in the motor system, muscles and motor neurons
6. Motor control models of the human voluntary movements
7. Models for motor planning in the human voluntary movements
8. Midterm examination

(Horikawa)
9. Introduction to the information processing in the nervous system
10. Structure of the nervous system and neuron
11. Action potentials and Hodgekin-Huxley equation
12-13. Information processing in the visual system
14. Information processing in the auditory system
15. Information processing in the somatosensory system
16. Final examination

(Fukumura)
1. Introduction to the computational neuroscience in the motor control system
2. Neuron models and simple perceptron
3. Multi-layered perceptron
4. Reinforcement learning
5. Information processing in the motor system, muscles and motor neurons
6. Motor control models of the human voluntary movements
7. Models for motor planning in the human voluntary movements
8. Midterm examination

(Horikawa)
9. Introduction to the information processing in the nervous system
10. Structure of the nervous system and neuron
11. Action potentials and Hodgekin-Huxley equation
12-13. Information processing in the visual system
14. Information processing in the auditory system
15. Information processing in the somatosensory system
16. Final examination

Self Preparation and Review

Related subjects

Notes for textbook

References:
Neural Networks for Control (W.Thomas Miller, Richard S.Sutton, and Paul J. Werbos1989)
Neuroscience – Exploring the brain (Bear, Connors, Paradiso, Lippincott Williams & Wilkins 2007), Cognitive Neuroscience – The biology of the brain (Gazzaniga, Ivry, Mangun, WW Norton & Co Incm 2008)

References:
Neural Networks for Control (W.Thomas Miller, Richard S.Sutton, and Paul J. Werbos1989)
Neuroscience – Exploring the brain (Bear, Connors, Paradiso, Lippincott Williams & Wilkins 2007), Cognitive Neuroscience – The biology of the brain (Gazzaniga, Ivry, Mangun, WW Norton & Co Incm 2008)

Notes for reference

Goals to be achieved

1. Understand the computational processing in the motor control
2. Understand neuron models, perceptron
3. Understand the motor control models of the human voluntary movements
4. Understand the models for motor planning of the human voluntary movements
5. Understand the structure and function of the nervous system
6. Understand neuron, synapse and Hodgekin-Huxley equation
7. Understand the information processing in the visual, auditory and somatosensory systems

1. Understand the computational processing in the motor control
2. Understand neuron models, perceptron
3. Understand the motor control models of the human voluntary movements
4. Understand the models for motor planning of the human voluntary movements
5. Understand the structure and function of the nervous system
6. Understand neuron, synapse and Hodgekin-Huxley equation
7. Understand the information processing in the visual, auditory and somatosensory systems

Evaluation of achievement

Midterm examination (50%) and final examination (50%), A: 100-80, B: 79-65, C: 64-55, D (fail): 54-0
Midterm examination (50%) and final examination (50%), A: 100-80, B: 79-65, C: 64-55, D (fail): 54-0

Examination

Details of examination

Other information

N. Fukumura (C611, Tel: 0532-44-6772, fukumura@cs.tut.ac.jp)
J. Horikawa (F407, Tel: 0532-44-6891, horikawa@cs.tut.ac.jp)

N. Fukumura (C611, Tel: 0532-44-6772, fukumura@cs.tut.ac.jp)
J. Horikawa (F407, Tel: 0532-44-6891, horikawa@cs.tut.ac.jp)

Reference URL

Office hours

Thursday 16:20-17:50
Thursday 16:20-17:50

Relations to attainment objectives of learning and education

D1

D1

Key words

(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.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]	高橋　由雅 TAKAHASHI Yoshimasa				
Numbering					

Objectives of class

The purpose of this course is to introduce and explain practical and applied approaches to multivariate data analysis (or mining) and knowledge discovery with illustrative examples through chemical data space. 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 multivariate data analysis (or mining) and knowledge discovery with illustrative examples through chemical data space. 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.Introduction: Chemical data space
2.Multiple linear regression analysis (MLRA)
3.Regression analysis and quantitative structure-activity relationships (QSAR)
4.What can you learn from QSAR?
5.Principal component analysis (PCA) and data visualization
6.Data scaling
7.Statistical discriminant analysis
8.Basis of pattern recognition
9.Linear binary pattern classifier
10.Basis of classification learning: perceptron model
11.Artificial neural network (ANN)
12.Chemical application of ANN
13.Support vector machine (SVM)
14.Chemical application of SVM
15.Concluding remark

Topics to be covered:

1.Introduction: Chemical data space
2.Multiple linear regression analysis (MLRA)
3.Regression analysis and quantitative structure-activity relationships (QSAR)
4.What can you learn from QSAR?
5.Principal component analysis (PCA) and data visualization
6.Data scaling
7.Statistical discriminant analysis
8.Basis of pattern recognition
9.Linear binary pattern classifier
10.Basis of classification learning: perceptron model
11.Artificial neural network (ANN)
12.Chemical application of ANN
13.Support vector machine (SVM)
14.Chemical application of SVM
15.Concluding remark

Self Preparation and Review

Related subjects

Linear Algebra, Elementary Analytics
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).

(Reference)
Textbooks for multivariate data analysis and pattern recognition are helpful
Material will be made available in the form of hard copies or on the class website (to be announced).

(Reference)
Textbooks for multivariate data analysis and pattern recognition are helpful

Notes for reference

Goals to be achieved

/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 the principle of statistical linear discriminant analysis which is a statistical pattern recognition method.
/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.

/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 the principle of statistical linear discriminant analysis which is a statistical pattern recognition method.
/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 50%
Written examination 50%
Reports and classroom performance 50%
Written examination 50%

Examination

Details of examination

Other information

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

Reference URL

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

(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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
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, especially English, 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, especially English, 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

Notes for textbook

Notes for reference

Goals to be achieved

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

(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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
Numbering					

Objectives of class

Based on the Seminar on Environmental and Life Science II, 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 II, 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 expected to read textbooks and papers in international journals 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 in international journals indicated by his/her supervisor, and report and discuss deeply on his/her research subject in the seminar.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

(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 School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

In the course, the students will perform the advanced research on the environmental and life science under the direction of his/her supervisor in the laboratory. The students will acquire the knowledge and experimental and analytical skills required for his/her research subject and learn the scientific and social importance of his/her subject by researching for related studies by others and 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 the advanced research on the environmental and life science under the direction of his/her supervisor in the laboratory. The students will acquire the knowledge and experimental and analytical skills required for his/her research subject and learn the scientific and social importance of his/her subject by researching for related studies by others and 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 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 prepared as a Master's Thesis, and the students must present the results from his/her research, discuss and answer the questions with the reviewers in the final review of his/her Master's Thesis.

The students will 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 prepared as a Master's Thesis, and the students must present the results from his/her research, discuss and answer the questions with the reviewers in the final review of his/her Master's Thesis.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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
Office hours
Relations to attainment objectives of learning and education
Key words

(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

(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]	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 the advanced research on the environmental and life science under the direction of his/her supervisor in the laboratory. The students will acquire the knowledge and experimental and analytical skills required for his/her research subject and learn the scientific and social importance of his/her subject by researching for related studies by others and 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 the advanced research on the environmental and life science under the direction of his/her supervisor in the laboratory. The students will acquire the knowledge and experimental and analytical skills required for his/her research subject and learn the scientific and social importance of his/her subject by researching for related studies by others and 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 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 prepared as a Master's Thesis, and the students must present the results from his/her research, discuss and answer the questions with the reviewers in the final review of his/her Master's Thesis.

The students will 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 prepared as a Master's Thesis, and the students must present the results from his/her research, discuss and answer the questions with the reviewers in the final review of his/her Master's Thesis.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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
Office hours
Relations to attainment objectives of learning and education
Key words

(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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
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

Notes for textbook

Notes for reference

Goals to be achieved

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

(M44630010)Advanced Separation Chemistry I[Advanced Separation Chemistry I]

Subject name[English]	Advanced Separation Chemistry I[Advanced Separation Chemistry I]				
Schedule number	M44630010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 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]	齊戸　美弘 SAITO Yoshihiro				
Numbering					

Objectives of class

Due to the recent requirements for stationary phases in chromatography such as higher selectivity, various novel stationary phases have been developed by the systematic analysis of the retention behavior of sample solutes. Miniaturization and automation of the whole separation instruments have been regarded as additional important projects in separation science, because of the increasing requirements for recent separation systems, such as selective/specific detection with high sensitivities, high throughput processing, as well as an environmentally-friendly feature of the systems. In this course, novel technologies of sample preparation and chromatographic separations will be provided along with the miniaturization of the hyphenated analytical systems.

Due to the recent requirements for stationary phases in chromatography such as higher selectivity, various novel stationary phases have been developed by the systematic analysis of the retention behavior of sample solutes. Miniaturization and automation of the whole separation instruments have been regarded as additional important projects in separation science, because of the increasing requirements for recent separation systems, such as selective/specific detection with high sensitivities, high throughput processing, as well as an environmentally-friendly feature of the systems. In this course, novel technologies of sample preparation and chromatographic separations will be provided along with the miniaturization of the hyphenated analytical systems.

Contents of class

1. Development of novel stationary phases in liquid chromatography based on the systematic analysis of retention behavior.
2. Development of novel sample preparation media and the applications to real sample analysis in various chromatographic methods.
3. Miniaturization of analytical systems and the hyphenation.

1. Development of novel stationary phases in liquid chromatography based on the systematic analysis of retention behavior.
2. Development of novel sample preparation media and the applications to real sample analysis in various chromatographic methods.
3. Miniaturization of analytical systems and the hyphenation.

Self Preparation and Review

Related subjects

Advanced Separation Chemistry II.

Advanced Separation Chemistry II.

Notes for textbook

No text book is required, however, basic knowledge of chromatography is desirable.

No text book is required, however, basic knowledge of chromatography is desirable.

Notes for reference

Goals to be achieved

Evaluation of achievement

The evaluation will be made based on the score of the report and presentation.

The evaluation will be made based on the score of the report and presentation.

Examination

Details of examination

Other information

Y. Saito; Room# B-404; Phone 6803; E-mail: saito@ens.tut.ac.jp

Y. Saito; Room# B-404; Phone 6803; E-mail: saito@ens.tut.ac.jp

Reference URL

Office hours

Anytime if available, however, an appointment by e-mail is strongly recommended.

Anytime if available, however, an appointment by e-mail is strongly recommended.

Relations to attainment objectives of learning and education

Key words

(M44630020)Advanced Separation Chemistry II[Advanced Separation Chemistry II]

Subject name[English]	Advanced Separation Chemistry II[Advanced Separation Chemistry II]				
Schedule number	M44630020	**Subject area**	Advanced Environmental and Life Sciences	**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]	平田　幸夫 HIRATA Yukio				
Numbering					

Objectives of class

Chromatography is one of the most widely applied methods for the analysis of mixtures, because of its high resolving power. Purpose of this course is to learn the basic theory of chromatography. To obtain the in-depth understanding, the emphasis is also placed on practice and reports on the related topics.

Chromatography is one of the most widely applied methods for the analysis of mixtures, because of its high resolving power. Purpose of this course is to learn the basic theory of chromatography. To obtain the in-depth understanding, the emphasis is also placed on practice and reports on the related topics.

Contents of class

1. Basic theory of chromatography
- distribution equilibrium
- plate theory
- rate theory
- resolution
- mobile and stationary phases

2. Practice and Repots for various simulation using Excel
- chromatographic separation process
- effect of various parameters on the separation efficiency
- effect of temperature in GC
- effect of mobile phase composition in LC
- analysis of chromatographic data

1. Basic theory of chromatography
- distribution equilibrium
- plate theory
- rate theory
- resolution
- mobile and stationary phases

2. Practice and Repots for various simulation using Excel
- chromatographic separation process
- effect of various parameters on the separation efficiency
- effect of temperature in GC
- effect of mobile phase composition in LC
- analysis of chromatographic data

Self Preparation and Review

Related subjects

Notes for textbook

Textbook

No textbook is required. Related materials will be provided.Elementary knowledge of Basic Language is required to use Excel-VBA.

Reference

1) "Chromatography: Concepts and Contrasts", J. M. Miller, John Wiley & Sons"

Textbook
No textbook is required. Related materials will be provided.Elementary knowledge of Basic Language is required to use Excel-VBA.

Reference
1) "Chromatography: Concepts and Contrasts", J. M. Miller, John Wiley & Sons"

Notes for reference

Goals to be achieved
To undersatnd the principle of chromatography.

To undersatnd the principle of chromatography.

Evaluation of achievement
Based on reports requested on individual chromatographic topic of interest during the course of class.

Based on reports requested on individual chromatographic topic of interest during the course of class.

Examination

Details of examination

Other information
Yukio Hirata: room (B-402), e-mail (hirata@ens.tut.ac.jp), phone: 6804

Yukio Hirata: room (B-402), e-mail (hirata@ens.tut.ac.jp), phone: 6804

Reference URL

Office hours
As needed.
As needed.

Relations to attainment objectives of learning and education

Key words

(M44630110)Developmental Neuroscience[Developmental Neuroscience]

Subject name[English]	Developmental Neuroscience[Developmental Neuroscience]				
Schedule number	M44630110	**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]	吉田　祥子 YOSHIDA Sachiko				
Numbering					

Objectives of class

Objective of class is to develop a new technology for detection of neuronal function in your brain. We deal with neuronal property and development of neuronal circuit, and discuss applicability and problem of your ideas.

Objective of class is to develop a new technology for detection of neuronal function in your brain. We deal with neuronal property and development of neuronal circuit, and discuss applicability and problem of your ideas.

Contents of class

(1)Properties of neuronal cells
(2)Electrical function and ion transport
(3)Chemical information transport
(4)Development of neuronal circuit
(5)Detection of chemical information
(6)Detection of electrical information
(7)Detection of cortical development

(1)Properties of neuronal cells
(2)Electrical function and ion transport
(3)Chemical information transport
(4)Development of neuronal circuit
(5)Detection of chemical information
(6)Detection of electrical information
(7)Detection of cortical development

Self Preparation and Review

Related subjects

A firm understanding on fundamental biochemistry and thermodynamics will be necessary.

A firm understanding on fundamental biochemistry and thermodynamics will be necessary.

Notes for textbook

Web-based text will be distributed.

(Reference)
From Neuron To Brain 4th Ed, Nicholls et. al. (Sinauer, 2001)

Web-based text will be distributed.

(Reference)
From Neuron To Brain 4th Ed, Nicholls et. al. (Sinauer, 2001)

Notes for reference

Goals to be achieved

Evaluation of achievement

Short reports on Web; 40%, Term report; 60%

Short reports on Web; 40%, Term report; 60%

Examination

Details of examination

Other information Room: B-406, E-mail:syoshida@ens.tut.ac.jp Room: B-406, E-mail:syoshida@ens.tut.ac.jp
Reference URL https://moodle.imc.tut.ac.jp/ https://moodle.imc.tut.ac.jp/
Office hours
Relations to attainment objectives of learning and education
Key words

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

Subject name[English]	Advanced Electrical and Electronic Technology for Ecological Engineering[Advanced Electrical and Electronic Technology for Ecological Engineering]				
Schedule number	M44630140	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 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]	田中　三郎, 廿日出　好, 水野　彰, 髙島　和則 TANAKA Saburo, HATSUKADE Yoshimi, MIZUNO Akira, TAKASHIMA Kazunori				
Numbering					

Objectives of class

Electrical and electronic engineering also contribute for remediation and improvement of our environment and society. For instance, electrostatic precipitation (ESP) has been contributing to clean flue gas in industry. ESP uses corona discharge that generates ions. Suspended particles are charged by those ions, and separated from gas stream. At the meantime, corona discharge ionize the air, and generates radicals which promote chemical reactions. Decompsition of gaseous pollutants are possible using radicals.
In this lecture, fundamental processes of ESPs and possible applications of chemical reactions promoted by radicals will be explained. Understanding of these fundamentals will expand the ability to solve environmental problems.
Electrical and electronic engineering also contribute for remediation and improvement of our environment and society. For instance, electrostatic precipitation (ESP) has been contributing to clean flue gas in industry. ESP uses corona discharge that generates ions. Suspended particles are charged by those ions, and separated from gas stream. At the meantime, corona discharge ionize the air, and generates radicals which promote chemical reactions. Decompsition of gaseous pollutants are possible using radicals.
In this lecture, fundamental processes of ESPs and possible applications of chemical reactions promoted by radicals will be explained. Understanding of these fundamentals will expand the ability to solve environmental problems.

Contents of class

1. Fundamental of Electrostatics---Features of electrostatic forces on fine objects
2. Ionization and generation of electrical discharges
2.1 Process of ionization
2.2 Electrical discharges
3. Electrostatic precipitation
3.1 Particle charging
3.2 Particle transport
3.3 Collection efficiency
3.4 Problems in ESPs
4. Plasma chemical reaction and its application in environmental technology
4.1 Generation of atmospheric plasma in combination with catalyst
4.2 Application of plasma chemical reactions
4.3 Effect of radicals on microbes and viruses
1. Fundamental of Electrostatics---Features of electrostatic forces on fine objects
2. Ionization and generation of electrical discharges
2.1 Process of ionization

2.2 Electrical discharges
3. Electrostatic precipitation
3.1 Particle charging
3.2 Particle transport
3.3 Collection efficiency
3.4 Problems in ESPs
4. Plasma chemical reaction and its application in environmental technology
4.1 Generation of atmospheric plasma in combination with catalyst
4.2 Application of plasma chemical reactions
4.3 Effect of radicals on microbes and viruses

Self Preparation and Review

Related subjects
None
None

Notes for textbook
No text book is required.
No text book is required.

Notes for reference

Goals to be achieved
Understanding of fundamental electrostatics
Understanding of fundamental electrostatics

Evaluation of achievement
Score of the report and presentation will be evaluated.
Score of the report and presentation will be evaluated.

Examination

Details of examination

Other information
Akira MIZUNO: Room G-607, mizuno@ens.tut.ac.jp

Akira MIZUNO: Room G-607, mizuno@ens.tut.ac.jp

Reference URL
http://ens.tut.ac.jp/electrostatics/
http://ens.tut.ac.jp/electrostatics/

Office hours
Anytime, however, appoint by e-mail is required.
Anytime, however, appoint by e-mail is required.

Relations to attainment objectives of learning and education
For future work in environmental engineering, understanding of basic electrostatics and plasma chemical processes is beneficial, and will improve ability to apply these basic processes for environmental problems.

For future work in environmental engineering, understanding of basic electrostatics and plasma chemical processes is beneficial, and will improve ability to apply these basic processes for environmental problems.

Key words

(M44630160)Advanced Eco-Materials Engineering[Advanced Eco-Materials Engineering]

Subject name[English]	Advanced Eco-Materials Engineering[Advanced Eco-Materials Engineering]				
Schedule number	M44630160	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Fri.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]	辻 秀人 TSUJI Hideto				
Numbering					

Objectives of class

The Eco-Materials Engineering is developed and studied for reducing the environmental impact. The aim of this course is to allow the student to achieve understanding basic concept of the biobased and biodegradable polymers.

The Eco-Materials Engineering is developed and studied for reducing the environmental impact. The aim of this course is to allow the student to achieve understanding basic concept of the biobased and biodegradable polymers.

Contents of class

This course deals with all the aspects of the biobased and biodegradable polymers for reducing the impact on the environmental. The detailed course schedule is shown below:
(1) Introduction, (2) Synthesis, (3) Molding, (4) Crystallization, (5) Structure, (6) Physical properties, (7) Hydrolytic degradation, (8) Biodegradation, and (9) Applications.

This course deals with all the aspects of the biobased and biodegradable polymers for reducing the impact on the environmental. The detailed course schedule is shown below:
(1) Introduction, (2) Synthesis, (3) Molding, (4) Crystallization, (5) Structure, (6) Physical properties, (7) Hydrolytic degradation, (8) Biodegradation, and (9) Applications.

Self Preparation and Review

Related subjects

Notes for textbook

Printed materials from Biopolymers vol. 4 (Polyesters III), Y. Doi, A. Steinbuchel Eds., Wiley-VCH, 2002

Printed materials from Biopolymers vol. 4 (Polyesters III), Y. Doi, A. Steinbuchel Eds., Wiley-VCH, 2002

Notes for reference

Goals to be achieved

Evaluation of achievement

Reports and presentation

Reports and presentation

Examination

Details of examination

Other information

Phone: 0532-44-6922, e-mail: tsuji@ens.tut.ac.jp (Hideto Tsuji)

Phone: 0532-44-6922, e-mail: tsuji@ens.tut.ac.jp (Hideto Tsuji)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M44630190)Advanced Sustainable Coordinator[Advanced Sustainable Coordinator]

Subject name[English]	Advanced Sustainable Coordinator[Advanced Sustainable Coordinator]				
Schedule number	M44630190	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Thu.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]	後藤　尚弘 GOTOH Naohiro				
Numbering					

Objectives of class

To establish a "Sustainable Society" is one of major fields for sustainable development. Countermeasures for it should be comprehensive and they comprise not only engineering but also several disciplines. The objectives of this class are
1 to comprehend notion of "Sustainable Society"
2 to learn human dimensional disciplines for "Sustainable Society"
3 to know planning method to establish "Sustainable Society" though examples

To establish a "Sustainable Society" is one of major fields for sustainable development. Countermeasures for it should be comprehensive and they comprise not only engineering but also several disciplines. The objectives of this class are
1 to comprehend notion of "Sustainable Society"
2 to learn human dimensional disciplines for "Sustainable Society"
3 to know planning method to establish "Sustainable Society" though examples

Contents of class

1 Concept of Sustainable development
2 Material (Substance) flow analysis
3 Life Cycle Assessment
4 Japanese environmental law and institution
5 Environmental management, CSR
6 Resource consumption transition
7 Environmental technology communication
1 Concept of Sustainable development
2 Material (Substance) flow analysis
3 Life Cycle Assessment
4 Japanese environmental law and institution
5 Environmental management, CSR
6 Resource consumption transition
7 Environmental technology communication

Self Preparation and Review

Related subjects

Notes for textbook

I will distribute copies of textbook in the first day.
・World resource institute, Weight of Nations
http://pubs.wri.org/pubs_description.cfm?PubID=3023
・NIES, Material Flow Data Book ~World Resource Flows around Japan~
http://www-cger.nies.go.jp/publication/D033/cd/index.html

I will distribute copies of textbook in the first day.
・World resource institute, Weight of Nations
http://pubs.wri.org/pubs_description.cfm?PubID=3023
・NIES, Material Flow Data Book ~World Resource Flows around Japan~
http://www-cger.nies.go.jp/publication/D033/cd/index.html

Notes for reference
Goals to be achieved to understant how to establish sustainable society to understant how to establish sustainable society
Evaluation of achievement Every week and Term end report (100%) Every week and Term end report (100%)
Examination
Details of examination
Other information (G603) goto@ens.tut.ac.jp (G603) goto@ens.tut.ac.jp
Reference URL
Office hours Thursday 10:00-12:00 Thursday 10:00-12:00
Relations to attainment objectives of learning and education
Key words Sustainablity, Environmental Policy, MFA, LCA, CSR, EMS Sustainablity, Environmental Policy, MFA, LCA, CSR, EMS

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

Subject name[English]	Advanced Supercritical Fluid Engineering[Advanced Supercritical Fluid Engineering]				
Schedule number	M44630200	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Thu.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]	大門 裕之 DAIMON Hiroyuki				
Numbering					

Objectives of class

Based on Supercritical Fluid Engineering and Environmental Chemical Engineering, practical philosophy, creativity and leadership of engineer are improved during this course. The topics are mainly waste management and utilization of biomass. Environmental issue is widely discussed to obtain the knowledge and organizing skill of comprehensive process or society.

Based on Supercritical Fluid Engineering and Environmental Chemical Engineering, practical philosophy, creativity and leadership of engineer are improved during this course. The topics are mainly waste management and utilization of biomass. Environmental issue is widely discussed to obtain the knowledge and organizing skill of comprehensive process or society.

Contents of class

1st Summary
2nd History
3rd Physical property 1
4th Physical property 2
5th Instrumentation and process engineering
6th Application of Supercritical Water Technologies 1
7th Application of Supercritical Water Technologies 2
8th Application of Supercritical Water Technologies 3
9th Application of Supercritical Water Technologies 4
10th Application of Supercritical Water Technologies 5
11th Application of Supercritical Carbon dioxide Technologies 1
12th Application of Supercritical Carbon dioxide Technologies 2
13th Application of Supercritical Carbon dioxide Technologies 3
14th Application of Supercritical Carbon dioxide Technologies 4
15th Examination

1st Summary
2nd History
3rd Physical property 1
4th Physical property 2
5th Instrumentation and process engineering
6th Application of Supercritical Water Technologies 1
7th Application of Supercritical Water Technologies 2
8th Application of Supercritical Water Technologies 3
9th Application of Supercritical Water Technologies 4
10th Application of Supercritical Water Technologies 5
11th Application of Supercritical Carbon dioxide Technologies 1
12th Application of Supercritical Carbon dioxide Technologies 2
13th Application of Supercritical Carbon dioxide Technologies 3
14th Application of Supercritical Carbon dioxide Technologies 4
15th Examination

Self Preparation and Review

Related subjects

Advanced Analytical Separation Chemistry, Advanced Industrial Ecology

Advanced Analytical Separation Chemistry, Advanced Industrial Ecology

Notes for textbook

1. Analytical Supercritical Fluid Chromatography and Extraction
edited by M. L. Lee and K. E. Markides, 1990

Chromatography Conference, Inc.
2. Hyphenated Techniques in Supercritical Fluid Chromatography and Extraction
edited by K. Jinno, 1992
Elsevier
1. Analytical Supercritical Fluid Chromatography and Extraction
edited by M. L. Lee and K. E. Markides, 1990
Chromatography Conference, Inc.
2. Hyphenated Techniques in Supercritical Fluid Chromatography and Extraction
edited by K. Jinno, 1992
Elsevier

Notes for reference

Goals to be achieved

1. To understand Supercritical Fluid Technology
2. To improve engineering skill
3. To obtain the knowledge about Environmental problem especially for waste management
1. To understand Supercritical Fluid Technology
2. To improve engineering skill
3. To obtain the knowledge about Environmental problem especially for waste management

Evaluation of achievement

Based on Presentation and Interview during class
More than
80% ; A
65% ; B
55% ; C
Based on Presentation and Interview during class
More than
80% ; A
65% ; B
55% ; C

Examination

Details of examination

Other information

Office：Builing G, Floor 6th, Room 602
Tel:0532-44-6905
Email:daimon@ens.tut.ac.jp

Office：Builing G, Floor 6th, Room 602
Tel:0532-44-6905
Email:daimon@ens.tut.ac.jp

Reference URL

http://water.eco.tut.ac.jp/class.html (English version under construction)
http://water.eco.tut.ac.jp/class.html (English version under construction)

Office hours

After the class or anytime when you make an appointment through Email
After the class or anytime when you make an appointment through Email

Relations to attainment objectives of learning and education

(D)

(D)

Key words

Supercritical Fluids, Resource Recovery, Material and Energy Balance, Process Engineering
Supercritical Fluids, Resource Recovery, Material and Energy Balance, Process Engineering

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

Subject name[English]	Advanced Life Science and Biotechnology II[Advanced Life Science and Biotechnology II]				
Schedule number	M44630220	**Subject 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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
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 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 the selected subject in the realm of further 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 type and contents of this course depend on his/her supervisor.

The classes will be given by his/her supervisor. The type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

Relations to attainment objectives of learning and education

Key words

(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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
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 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 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 type and contents of this course depend on his/her supervisor.

The classes will be given by his/her supervisor. The type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

Relations to attainment objectives of learning and education

Key words

(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]	各教員, S4系教務委員 KAKUKYOUIN Kakukyouin, 4kei kyomu Iin-S				
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 type and contents of this course depend on his/her supervisor.

The classes will be given by his/her supervisor. The type and contents of this course depend on his/her supervisor.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]				
Schedule number	M45610010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	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]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
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]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
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**	Intensive	**Credit(s)**	6
Faculty	Graduate School of Engineering			**Subject grade**	1～1
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S5系教務委員 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**	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

(M45630040)Geologic Hazard and Mitigation Planning[Geologic Hazard and Mitigation Planning]

Subject name[English]	Geologic Hazard and Mitigation Planning[Geologic Hazard and Mitigation Planning]				
Schedule number	M45630040	**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]	河邑 眞 KAWAMURA Makoto				
Numbering					

Objectives of class

The objective are to underdstand the characteristics of geologic ahzards such as earthquakes,landslides,and flloodings and to learn environment planning to mitigate the disasters.

The objective are to underdstand the characteristics of geologic ahzards such as earthquakes,landslides,and flloodings and to learn environment planning to mitigate the disasters.

Contents of class

1 : An introduction to geology and planning
2 : Earthquakes and faulting
3 : Volcanic activity
4 : Soil properties and problems
5 : Landslides
6 : Subsidence
7 : Coastal Process
8 : Flooding
9 : Groudwater
10 : Waste treatment
11 : Mineral resouses
12 : Energy resources
13 : Environmental planning
14 : Environmental law

1 : An introduction to geology and planning
2 : Earthquakes and faulting
3 : Volcanic activity
4 : Soil properties and problems
5 : Landslides
6 : Subsidence
7 : Coastal Process
8 : Flooding
9 : Groudwater
10 : Waste treatment
11 : Mineral resouses
12 : Energy resources
13 : Environmental planning
14 : Environmental law

Self Preparation and Review

Related subjects

geology,urban planning,risk management

geology,urban planning,risk management

Notes for textbook

Referrence:
Griggs and Gilchrist:Geologic hazards,resources,and environmental planning,
Wadsworth Publishing Company,1983.

Referrence:
Griggs and Gilchrist:Geologic hazards,resources,and environmental planning,
Wadsworth Publishing Company,1983.

Notes for reference

Goals to be achieved

・Understanding the characteristics of geologic hazards such as earthquake,landslide and flooding.
・Understanding the land use planning and law for mitigation of the disaster.
・Understanding the characteristics of geologic hazards such as earthquake,landslide and flooding.
・Understanding the land use planning and law for mitigation of the disaster.

Evaluation of achievement

Report and the presentation of the report.
Report and the presentation of the report.

Examination

Details of examination

Other information

office:D-806
Tel:0532-44-6847
E-mail:kawamura@tutrp.tut.ac.jp
office:D-806
Tel:0532-44-6847
E-mail:kawamura@tutrp.tut.ac.jp

Reference URL

preparing
preparing

Office hours

13:00-15:00 Tuesday
13:00-15:00 Tuesday

Relations to attainment objectives of learning and education

graduate course subject is not related with JABEE

graduate course subject is not related with JABEE

Key words

geologic hazard,　mitigation planning
geologic hazard,　mitigation planning

(M45630090)Coastal Hydraulics[Coastal Hydraulics]

Subject name[English]	Coastal Hydraulics[Coastal Hydraulics]				
Schedule number	M45630090	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.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]	加藤 茂 KATO Shigeru				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Basic knowledge of coastal engineering is desirable.

Basic knowledge of coastal engineering is desirable.

Notes for textbook

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

(Reference)
"Water Wave Mechanics for Engineers and Scientists – Advanced Series on Ocean Engineering – Vol. 2" Robert G. Dean & Robert A.
Dalrymple (World Scientific)
"Introduction to Coastal Engineering and Management -- Advanced Series on OceanEngineering -- Volume 16" J. William Kamphuis (World Scientific)
"Basic Coastal Engineering " Robert M. Sorensen (Kluwer Academic Publishers)

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

(Reference)
"Water Wave Mechanics for Engineers and Scientists – Advanced Series on Ocean Engineering – Vol. 2" Robert G. Dean & Robert A.
Dalrymple (World Scientific)
"Introduction to Coastal Engineering and Management -- Advanced Series on OceanEngineering -- Volume 16" J. William Kamphuis (World Scientific)
"Basic Coastal Engineering " Robert M. Sorensen (Kluwer Academic Publishers)

Notes for reference

Goals to be achieved
Understanding the concept and methodology for coastal management.
Understanding the concept and methodology for coastal management.

Evaluation of achievement
Report
Report

Examination

Details of examination

Other information
Room : D-812
E-mail : s-kato@ace.tut.ac.jp.
Room : D-812
E-mail : s-kato@ace.tut.ac.jp.

Reference URL
N/A
N/A

Office hours
Monday, 13:00-14:30
Monday, 13:00-14:30

Relations to attainment objectives of learning and education
N/A

N/A

Key words
Sediment transport, Current, Waves, Shore protection and management
Sediment transport, Current, Waves, Shore protection and management

(M45630140)Advanced District Planning[Advanced District Planning]

Subject name[English]	Advanced District Planning[Advanced District Planning]				
Schedule number	M45630140	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Fri.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]	浅野　純一郎 ASANO Junichiro				
Numbering					

Objectives of class

1) To gain the practical knowledge of urban and district planning.
2) To learn the advanced methods of district planning and design.
3) To learn the theory and the system of Japanese land use control system and land readjustment projects.

1) To gain the practical knowledge of urban and district planning.
2) To learn the advanced methods of district planning and design.
3) To learn the theory and the system of Japanese land use control system and land readjustment projects.

Contents of class

The major topics that will be addressed in this class are the followings.
1. Overview of the theory and concrete policy and methods about modern urban planning system in Japanese
2. Overview of Japanese land use control system, especially area division system and development permission.
3. Overview of Japanese land readjustment projects.
4. Practice by application of the design methods about land readjustment project and district planning.
Reporting textbook "Urban Planning System in Japan 2nd Edition" and doing workshop about land readjustment project and district planning.

The major topics that will be addressed in this class are the followings.
1. Overview of the theory and concrete policy and methods about modern urban planning system in Japanese
2. Overview of Japanese land use control system, especially area division system and development permission.
3. Overview of Japanese land readjustment projects.
4. Practice by application of the design methods about land readjustment project and district planning.
Reporting textbook "Urban Planning System in Japan 2nd Edition" and doing workshop about land readjustment project and district planning.

Self Preparation and Review

Related subjects

The following knowledge is desirable,
1) The basic knowledge on modern urban planning
2) The knowledge on urban planning system in your country

The following knowledge is desirable,
1) The basic knowledge on modern urban planning
2) The knowledge on urban planning system in your country

Notes for textbook

・Urban Planning System in Japan 2nd Edition
・Urban Land Use Planning System in Japan 2dn Edition
Both have been published by Japan International Cooperation Agency

・Urban Planning System in Japan 2nd Edition
・Urban Land Use Planning System in Japan 2dn Edition

Both have been published by Japan International Cooperation Agency

Notes for reference

Goals to be achieved

Evaluation of achievement

Submitting reports about textbook and another theme. Oral presentation: 30%, Written report: 70%

Submitting reports about textbook and another theme. Oral presentation: 30%, Written report: 70%

Examination

Details of examination

Other information

Reference URL

https://webct.edu.tut.ac.jp:443/webct/public/home.pl
or https://moodle.imc.tut.ac.jp/
More information and pdf.files of textbook will be offered from Webct.

https://webct.edu.tut.ac.jp:443/webct/public/home.pl
or https://moodle.imc.tut.ac.jp/
More information and pdf.files of textbook will be offered from Webct.

Office hours

Relations to attainment objectives of learning and education

Key words

District planning, Land use control system, Land readjustment project

District planning, Land use control system, Land readjustment project

(M45630150)Advanced Transportation and Traffic Engineering[Advanced Transportation and Traffic Engineering]

Subject name[English]	Advanced Transportation and Traffic Engineering[Advanced Transportation and Traffic Engineering]				
Schedule number	M45630150	**Subject area**	Advanced Architecture and Civil 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]	廣畠 康裕 HIROBATA Yasuhiro				
Numbering					

Objectives of class

To gain advanced knowledge of theories and methods for transportation planning and traffic engineering measures especially in urban areas.

To gain advanced knowledge of theories and methods for transportation planning and traffic engineering measures especially in urban areas.

Contents of class

1.Characteristics of transportation systems/
2.Characteristics of transportation problems and policy issues/ 3.Transportation planning process and role of modeling/
4.Survey methods of travel demand and traffic flows/
5.Methods of travel demand analysis and modeling/
6.Methods of trffic flow analyses/
7.Methods of evaluating transportation plan and traffic measures/
8.Other topics : Traffic flow theory, value of travel time, and valuing external effects of transportation

1.Characteristics of transportation systems/
2.Characteristics of transportation problems and policy issues/ 3.Transportation planning process and role of modeling/
4.Survey methods of travel demand and traffic flows/
5.Methods of travel demand analysis and modeling/
6.Methods of trffic flow analyses/
7.Methods of evaluating transportation plan and traffic measures/
8.Other topics : Traffic flow theory, value of travel time, and valuing external effects of transportation

Self Preparation and Review

Related subjects

Advanced Regional Planning and Design I,II
Advanced Regional Planning and Design I,II

Notes for textbook

Texts and papers will be decided by the opening of the class.

Texts and papers will be decided by the opening of the class.

Notes for reference

Goals to be achieved

1.To understand the necessity nad significance of transportation planning
2.To understand the concept of transportation planning
3.To gain the theories and methods in transportation planning
1.To understand the necessity nad significance of transportation planning
2.To understand the concept of transportation planning
3.To gain the theories and methods in transportation planning

Evaluation of achievement

Home work assignments will be required. Final reports or examination will be imposed.

Home work assignments will be required. Final reports or examination will be imposed.

Examination

Details of examination

Other information

room(D-705),hirobata@ace.tut.ac.jp

room(D-705),hirobata@ace.tut.ac.jp

Reference URL

Hirobata: http://www.tr.ace.tut.ac.jp

Hirobata: http://www.tr.ace.tut.ac.jp

Office hours

Hirobata: Mon,16:25-17:30; Tue,12:30-13:30
Hirobata: Mon,16:25-17:30; Tue,12:30-13:30

Relations to attainment objectives of learning and education

Key words

planning process, social & economic evaluation method, forecasting models
planning process, social & economic evaluation method, forecasting models

(M45630180)Advanced Computational Economics[Advanced Computational Economics]

Subject name[English]	Advanced Computational Economics[Advanced Computational Economics]				
Schedule number	M45630180	**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]	渋澤 博幸 SHIBUSAWA Hiroyuki				
Numbering					

Objectives of class

In this course, students learn the economic modeling techniques and the simulation methodology.
In this course, students learn the economic modeling techniques and the simulation methodology.

Contents of class

1-2: Input-Output Model
3-4: Simple 2 Sectors General Equilibrium Model
5-6: Inter-Sectoral General Equilibrium Model
7-8: Simulation and Numerical Example
9-11: Open Model with Exports and Imports
12-13: General Equilibrium Model with Public Sector
14-15: Simulation and Numerical Example
1-2: Input-Output Model
3-4: Simple 2 Sectors General Equilibrium Model
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7-8: Simulation and Numerical Example
9-11: Open Model with Exports and Imports
12-13: General Equilibrium Model with Public Sector
14-15: Simulation and Numerical Example

Self Preparation and Review

Related subjects

Economics, Policy, Simulation
Economics, Policy, Simulation

Notes for textbook

Papers will be distributed.
Papers will be distributed.

Notes for reference

Goals to be achieved

Advanced Computational Economics
Advanced Economic Simulation Model

Advanced Computational Economics
Advanced Economic Simulation Model

Evaluation of achievement

Reports must be submitted.
A: 80 Points or higher, B: 65 points or higher, C:55 points or higher, D: Less than 55 points

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Examination
Details of examination
Other information Room:B-409 Tel:6963 E-mail: hiro-shibu@tut.jp Room:B-409 Tel:6963 E-mail: hiro-shibu@tut.jp
Reference URL
Office hours Tuesday 9:00-10:00 Tuesday 9:00-10:00
Relations to attainment objectives of learning and education
Key words Computational Economics, Simulation Computational Economics, Simulation

(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]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
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

(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]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
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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

(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]	各教員, S5系教務委員 KAKUKYOUIN Kakukyouin, 5kei kyomu Iin-S				
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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