Syllabus

International Master′s Degree Program

（2015-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**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Common			**Beggining grade**	M1, M2
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. Materials are provided by Moodle.
8th week will be examination.
1)Probability
2)Normal Random Variables
3)Geometric Brownian Motion
4)Interest Rates and Present Value
5)Pricing Contracts via Arbitrage
6)Arbitrage Theorem
7)Black-Scholes Model
8)Examination

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

The handout will be distributed to students. Students must learn the contents of the handout before and after each lecture.
In Management Science 1, the class content will be explained about the fundamental ideas of pricing options in financial derivatives, based on the basic probability, normal random variables, geometric Brownian motion, interest rate, arbitrage, Black-Scholes formula, valuing by expected utility, exotic options, and so on. Materials are provided by Moodle.
8th week will be examination.
1)Probability
2)Normal Random Variables
3)Geometric Brownian Motion
4)Interest Rates and Present Value
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6)Arbitrage Theorem
7)Black-Scholes Model
8)Examination

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

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

Self Preparation and Review

Related subjects

Management of Technology, Modeling Regional Environment, Industrial Policies, Advanced Computational Economics
Management of Technology, Modeling Regional Environment, Industrial Policies, Advanced Computational Economics

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

試験期間中には何も行わない
None during exam period

Details of examination

Other information

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

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

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

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

Reference URL

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

Office hours

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

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

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

Relations to attainment objectives of learning and education

Key words
finance, stochastic process, multivariate analysis
finance, stochastic process, multivariate analysis

(M40030023)Industrial Policies[Industrial Policies]

Subject name[English]	Industrial Policies[Industrial Policies]				
Schedule number	M40030023	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Common			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	渋澤　博幸 SHIBUSAWA Hiroyuki				
Numbering					

Objectives of class

In this course, students learn the fundamental of input-output analysis and the industrial policy evaluation methodology.
In this course, students learn the fundamental of input-output analysis and the industrial policy evaluation methodology.

Contents of class

1: Introduction and Overview
2-6:Input-Output Analysis at the National Level
7-8: Numerical Examples and Case Studies at the National Level
9-13:Input-Output Analysis at the Regional Level
14-15: Numerical Examples and Case Studies at the Regional Level

1: Introduction and Overview
2-6:Input-Output Analysis at the National Level
7-8: Numerical Examples and Case Studies at the National Level
9-13:Input-Output Analysis at the Regional Level
14-15: Numerical Examples and Case Studies at the Regional Level

Self Preparation and Review

Related subjects

Economics, Policy, Simulation
Economics, Policy, Simulation

Notes for textbook

Papers will be distributed.

Reference：Miller and Blair, Input-Output Analysis(Second Edition), Cambridge University Press, 2009

Papers will be distributed.

Reference：Miller and Blair, Input-Output Analysis(Second Edition), Cambridge University Press, 2009

Reference1	**Book title**	Input-Output Analysis(Second Edition)			**ISBN**	978-0-521-73902
	Author	Miller and Blair	**Publisher**	Cambridge University Press	**Publish year**	2009

Notes for reference

Goals to be achieved

Advanced Input-Output Analysis
Advanced Economic Simulation Methods

Advanced Input-Output Analysis
Advanced Economic Simulation Methods

Evaluation of achievement

Test(50%)+Report(50%)=100%

A: 80 Points or higher, B:65 points or higher, C:55 points or higher, D: Less than 55 points

Test(50%)+Report(50%)=100%

A: 80 Points or higher, B:65 points or higher, C:55 points or higher, D: Less than 55 points

Examination

試験期間中には何も行わない

None during exam period

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

www.pm.ace.tut.ac.jp

www.pm.ace.tut.ac.jp

Office hours

Wednesday 9:00-10:00

Wednesday 9:00-10:00

Relations to attainment objectives of learning and education

Key words

Industrial Policy, Economics, Simulation

Industrial Policy, Economics, Simulation

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

Subject name[English]	Culture and Communication I[Culture and Communication I]				
Schedule number	M40030030	**Subject area**	General courses	**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	Common			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	社河内　友里 SHAKOUCHI Yuri				
Numbering					

Objectives of class

To deepen understanding of transformation of American culture by exploring the history of American comics from postwar period to present
To develop ability to discuss in a clear argument in English

To deepen understanding of transformation of American culture by exploring the history of American comics from postwar period to present
To develop ability to discuss in a clear argument in English

Contents of class

Week 1 Introduction
Week 2 Understanding comics
Week 3 Understanding comics
Week 4 Understanding comics
Week 5 Mainstream comics and underground comics
Week 6 Mainstream comics and underground comics
Week 7 Mainstream comics and underground comics
Week 8 Mainstream comics and underground comics
Week 9 Alternative comics
Week 10 Alternative comics
Week 11 Alternative comics
Week 12 Alternative comics
Week 13 Comics post 9.11
Week 14 Comics post 9.11
Week 15 Review

Week 1 Introduction
Week 2 Understanding comics
Week 3 Understanding comics
Week 4 Understanding comics
Week 5 Mainstream comics and underground comics
Week 6 Mainstream comics and underground comics
Week 7 Mainstream comics and underground comics
Week 8 Mainstream comics and underground comics
Week 9 Alternative comics
Week 10 Alternative comics
Week 11 Alternative comics
Week 12 Alternative comics
Week 13 Comics post 9.11
Week 14 Comics post 9.11
Week 15 Review

Self Preparation and Review

The instructor will provide reading materials for each class. Read them and prepare for the class.
The instructor will provide reading materials for each class. Read them and prepare for the class.

Related subjects

英米文化論Ⅲ　[British Culture and American Culture 3]
英米文化論Ⅲ　[British Culture and American Culture 3]

Notes for textbook

The instructor will provide all materials for this class.

The instructor will provide all materials for this class.

Notes for reference

Goals to be achieved

Students will have gained deeper understanding of American culture and ability to discuss in a clearer argument in English.

Students will have gained deeper understanding of American culture and ability to discuss in a clearer argument in English.

Evaluation of achievement

Students will be evaluated according to their participation (30%), little presentation (30%)
and a final report (40%).
Grade Distribution:
A: 80% or above
B: 65-79%
C: 55-64%
D: Under 55%

Students will be evaluated according to their participation (30%), little presentation (30%)
and a final report (40%).
Grade Distribution:
A: 80% or above
B: 65-79%
C: 55-64%
D: Under 55%

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Please make an appointment by email.

Please make an appointment by email.

Relations to attainment objectives of learning and education

Key words

American culture, comics

American culture, comics

(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.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Common			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	Lim Pang Boey, 澁谷 晃, 大門 裕之, 齊藤 大樹, 穂積 直裕, 髙嶋 孝明, 井佐原 均, 藤原 孝男, 寺嶋 一彦, 加藤 三保子, 柴崎 一郎, 鈴木 新一, 岩佐 精二, 福本 昌宏 Lim Pang Boey, SHIBUYA Akira, DAIMON Hiroyuki, SAITOH Taiki, HOZUMI Naohiro, TAKASHIMA Takaaki, ISAHARA Hitoshi, FUJIWARA Takao, TERASHIMA Kazuhiko, KATOH Mihoko, SHIBASAKI Ichiro, SUZUKI Shinichi, IWASA Seiji, FUKUMOTO Masahiro				
Numbering					

Objectives of class

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

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Contents of class

1. Lim Pang Boey "Japanese Education System"
Learn about the Japanese education system and what the life of a student is like in Japan?

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

3. Daimon "Working in Japanese Company"
Learn and discuss about working in Japanese company and what you should do for it.

4. Daimon "Waste Management"
Learn and discuss about the policy and concept on waste management in Jpanese society.

5. Shibuya This lecture aims to introduce Japan's international cooperation and mainly focuses on its historical background, basic implementation framework/system and activities of Official Development Assistance (ODA) of Japanese Government, and further, current issues for sustainable development of developing countries.

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

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

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

9. Iwasa "The Range of Organic Chemistry
I will give a talk on the following subjects as one of scene of science and technology in Japan:
◆Organic Chemistry in Environment —Amazing Natural Products—
◆Development of Life Environment —Molecular Sensor as an Basic Technology in all of Science—
◆New Horizon of Catalytic Asymmetric Synthesis —C1 Asymmetric Catalyst—

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

11. Takashima “A global company doing business in Japan”
IBM, a global enterprise, is running business in Japan more than 75 years. A history and transformation of IBM’s business in Japan are introduced. An insight that the lecturer got from the experience of working in IBM for 32 years is also shared.

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

13. Shibazaki In this lecture, I will give an example of reseach and development of new technology by Japanese company. The thin film Hall element or Hall sensor is a high sensitivity magnetic sensor which can detect magnetic flux density by using Hall effect. The main application is magnetic sensors to detect angular velocity of permanent magnet rotor of DC brushless motor or Hall motor. Why the Hall element must be developed and used so much is an interesting story. It may be also shown that how mass prosuction technology of Hall sensors was developed.

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

15. Suzuki ″Relativety, Energy and Japan″
Energy is one of the biggest issues for Japan. The class reviews the origin of the concept of nuclear energy and the relation between nuclear energy and Japan.

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◆Development of Life Environment —Molecular Sensor as an Basic Technology in all of Science—
◆New Horizon of Catalytic Asymmetric Synthesis —C1 Asymmetric Catalyst—

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

15. Suzuki "Relativety, Energy and Japan"
Energy is one of the biggest issues for Japan. The class reviews the origin of the concept of nuclear energy and the relation between nuclear energy and Japan.

Self Preparation and Review

Related subjects
N/A
N/A

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
Scoring will be performed by sum of each report evaluation.
Scoring will be performed by sum of each report evaluation.

Examination レポートで実施 By Report
Details of examination
Other information
Reference URL
Office hours After each class. After each class.
Relations to attainment objectives of learning and education
Key words Japan, Japanese, Culture, Religion, Politics & Economy, Technology Japan, Japanese, Culture, Religion, Politics & Economy, Technology

(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	Common			**Beggining grade**	M1, M2
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 Japanese students of the regular course. You will learn elementary Japanese grammar to speak Japanese through conversation with Japanese students.

This is a Japanese conversation class mixed with Japanese students of the regular course. You will learn elementary Japanese grammar to speak Japanese through conversation with Japanese students.

Contents of class

This class has the following three parts.

①Elementary Japanese grammar explanations (10:30-11:00)
②Group activities with Japanese students (conversation practice & discussion) (11:00-11:45)
③Elementary Japanese lessons(11:45-12:00)

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

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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

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

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

Notes for textbook

Reference1	**Book title**	「みんなの日本語 初級1 翻訳・文法解説 英語版」(Minnna no Nihongo 1 Translation & Grammatical Notes English) ￥2,000			**ISBN**	
	Author		**Publisher**	スリーエーネットワーク	**Publish year**	

Notes for reference

Goals to be achieved

You will be able to settle into conversation with Japanese students in easy Japanese.
You will be able to settle into conversation with Japanese students in easy Japanese.

Evaluation of achievement

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

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

Other information

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

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering I[Seminar on Mechanical Engineering I]				
Schedule number	M41610010	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering II[Seminar on Mechanical Engineering II]				
Schedule number	M41610020	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

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Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]				
Schedule number	M41610030	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]				
Schedule number	M41610030	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～1
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員, 1系各教員 1kei kyomu Iin-S, 1kei kakukyouin				
Numbering					

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

その他

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]				
Schedule number	M4161003T	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
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 research skills with a deep understanding of relevant knowledge.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering[Seminar on Mechanical Engineering]				
Schedule number	M41610040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Applied Mechanics of Materials[Applied Mechanics of Materials]				
Schedule number	M41630030	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	足立　忠晴 ADACHI Tadaharu				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Mechanics of Materials, Elasticity, Solid Mechanics
Mechanics of Materials, Elasticity, Solid Mechanics

Notes for textbook

Text will be distributed in class.
Text will be distributed in class.

Reference1	**Book title**	A First Course in Continuum Mechanics			**ISBN**	
	Author	Fung YC	**Publisher**	Prentice-Hall	**Publish year**	
Reference2	**Book title**	Mechanics of Engineering Materials			**ISBN**	
	Author	Benham PP, Crawford RJ and Armstrong CG	**Publisher**	Longman	**Publish year**	
Reference3	**Book title**	Classical and Computational Solid Mechanics			**ISBN**	
	Author	Fung YC and Pin T	**Publisher**	World Scientific	**Publish year**	2001
Reference4	**Book title**	Theory of Elasticity, Course of Theoretical Physics Vol.7			**ISBN**	
	Author	Landau L.D. and Lifshitz E.M.	**Publisher**		**Publish year**	1970
Reference5	**Book title**	Aircraft Structures for Engineering Students			**ISBN**	
	Author	Megson THG	**Publisher**	Butterworth-Heinemann	**Publish year**	2007

Notes for reference

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

Evaluation of achievement
Examinations, 80 % and attendances, 20 %
Examinations, 80 % and attendances, 20 %

Examination
レポートで実施
By Report

Details of examination

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

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

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

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Science and Technology of Thin Films[Science and Technology of Thin Films]				
Schedule number	M41630080	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	伊﨑　昌伸 IZAKI Masanobu				
Numbering					

Objectives of class

To understand fundamental thermodynamics and solid state physics of thin film and the applications

To understand fundamental thermodynamics and solid state physics of thin film and the applications

Contents of class

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

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

Self Preparation and Review

This class deals with the deposition mechanism based on the thermodynamics and the characteristics of structure, optical and electrical properties based on solid state physics.

This class deals with the deposition mechanism based on the thermodynamics and the characteristics of structure, optical and electrical properties based on solid state physics.

Related subjects

Basic knowledge of chemistry and solid-state physics

Basic knowledge of chemistry and solid-state physics

Notes for textbook

Reference1	**Book title**	Modern Electroplating, 5 th edition			**ISBN**	978-0-16778-6
	Author	M. schlesinger, M. Paunovic	**Publisher**	Weily & Sons	**Publish year**	2010

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Reports(50%) and presentation(50%)

Reports(50%) and presentation(50%)

Examination

レポートで実施

By Report

Details of examination

Other information

Masanobu Izaki, D-505, m-izaki@me.tut.ac.jp

Masanobu Izaki, D-505, m-izaki@me.tut.ac.jp

Reference URL

Office hours

as-needed

as-needed

Relations to attainment objectives of learning and education

Key words

thin films, thermodynamics, physics, semiconductor

thin films, thermodynamics, physics, semiconductor

(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	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 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 master thesis research work of a student.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 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 master thesis research work of a student.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	High-Speed Mechanics and Optical Measurement[High-Speed Mechanics and Optical Measurement]				
Schedule number	M41630300	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	鈴木　新一 SUZUKI Shinichi				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Reference1	**Book title**	The Quantum Theory of Light			**ISBN**	
	Author	Loudon,R.	**Publisher**	Oxford Science Publications	**Publish year**	2000
Reference2	**Book title**	Photonics			**ISBN**	
	Author	Yariv,A. and Yeh,P.	**Publisher**	Oxford University Press	**Publish year**	2007

Notes for reference

(1) Suzuki,S., et al., Measurement of energy release rate and energy flux
of rapidly bifurcating crack in Homalite 100 and Araldite B by high-speed holographic microscopy, J. Mech. Phys. Solids, Vol.55 (2007), 1487-1512.
(2) Suzuki,S. and Miyashita,T., Measuremet of Opening Displacement and Stress Intensity Factor of Bifurcated Notch by Moire Interferometry, J. Solid Mech. Materials Eng., Vol.2 (2008), 25-37.
(3) Shinichi Suzuki, et al., Measurement of Residual Stress of Light Bulbs for Automobiles by Photoelasticity, J. Japanese Soc. Experimental Mech., Vol.11 (2011), 188-194.

(1) Suzuki,S., et al., Measurement of energy release rate and energy flux
of rapidly bifurcating crack in Homalite 100 and Araldite B by high-speed holographic microscopy, J. Mech. Phys. Solids, Vol.55 (2007), 1487-1512.
(2) Suzuki,S. and Miyashita,T., Measuremet of Opening Displacement and Stress Intensity Factor of Bifurcated Notch by Moire Interferometry, J. Solid Mech. Materials Eng., Vol.2 (2008), 25-37.
(3) Shinichi Suzuki, et al., Measurement of Residual Stress of Light Bulbs for Automobiles by Photoelasticity, J. Japanese Soc. Experimental Mech., Vol.11 (2011), 188-194.

Goals to be achieved

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

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

Evaluation of achievement

Evaluation by a written homework assignment
Evaluation by a written homework assignment

Examination

レポートで実施
By Report

Details of examination

Other information

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

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Advances in Mechanical Design[Advances in Mechanical Design]				
Schedule number	M41630330	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Year	**Day of the week,period**		**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	森　謙一郎, 足立　忠晴 MORI Ken-Ichiro, ADACHI Tadaharu				
Numbering					

Objectives of class

This class is separated into two parts:

Prof. Mori

With the recent development of computers, numerical methods tend to be used in the field of manufacturing processes. The finite element method is mainly explained in this lecture. The finite element method is widely applied to engineering problems such as solid mechanics, fluid mechanics, etc.

Prof. Adachi

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

This class is separated into two parts:

Prof. Mori

With the recent development of computers, numerical methods tend to be used in the field of manufacturing processes. The finite element method is mainly explained in this lecture. The finite element method is widely applied to engineering problems such as solid mechanics, fluid mechanics, etc.

Prof. Adachi

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

Contents of class

Prof. Mori

1st week: Numerical Methods: finite difference method, finite element method and boundary element method
2nd week: Finite difference method for heat conduction: discretizaton of differential equation governing heat conduction, calculation of temperature distribution
3rd week: Basic equations in solid mechanics: three-dimensional stress and strain, equilibrium equations, constitutive equations in elasticity and plasticity, yield criteria, incompressibility condition, etc.
4th week: Finite element method for elastic deformation: triangular elements, distributions of displacement and strain
5th week: Equilibrium equations of nodal forces, stiffness matrix,
6th week: Treatment of boundary conditions
7th week: Plasticity, elastic-plastic finite element method
8th week: Summary

Prof. Adachi

Chapter 1. Introduction
Chapter 2. Automobile Structures from View of Solid Mechanics
Purpose of automobile structure, Loading to automobile structure
Deformation of automobile structure, Performance of automobile structure
Chapter 3. Fundamentals of Structural Mechanics

Fundamental equations in solid mechanics
Chapter 4. Forces and Moments Applying to Structures
Normal force, shear force, bending moment, torsional moment
Chapter 5. Elementary Mechanics of Structures
Torsion and bending of thin-walled beams
Chapter 6. Mechanics of Thin-Walled Structures
Torsion and bending of thin-walled beams
Chapter 7. Fundamentals of Dynamic Measurement
Frequency response, Strain gage, Load cell, Accelerator
Chapter 8. Summary
Prof. Mori
1st week: Numerical Methods: finite difference method, finite element method and boundary element method
2nd week: Finite difference method for heat conduction: discretizaton of differential equation governing heat conduction, calculation of temperature distribution
3rd week: Basic equations in solid mechanics: three-dimensional stress and strain, equilibrium equations, constitutive equations in elasticity and plasticity, yield criteria, incompressibility condition, etc.
4th week: Finite element method for elastic deformation: triangular elements, distributions of displacement and strain
5th week: Equilibrium equations of nodal forces, stiffness matrix,
6th week: Treatment of boundary conditions
7th week: Plasticity, elastic-plastic finite element method
8th week: Summary

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

Self Preparation and Review

Related subjects
Mechanics of Materials, Elasticity, Solid Mechanics
Mechanics of Materials, Elasticity, Solid Mechanics

Notes for textbook
Part 1 (Prof. Mori): handout

Text for Part (2) (Prof. Adachi) will be distributed in class.
Part 1 (Prof. Mori): handout

Text for Part (2) (Prof. Adachi) will be distributed in class.

Notes for reference

Goals to be achieved
Part (1) (Prof. Mori)
To understand the finite element method

Part (2) (Prof. Adachi)
To understand physical meaning fundamental equations in solid mechanics.
To deeply understand elementary mechanics of materials (strength of materials); tension of bar, torsion of axis and bending of beam.

To understand mechanics of thin-walled structures.
To know concept of dynamic measurement of deformation.
Part (1) (Prof. Mori)
To understand the finite element method

Part (2) (Prof. Adachi)
To understand physical meaning fundamental equations in solid mechanics.
To deeply understand elementary mechanics of materials (strength of materials); tension of bar, torsion of axis and bending of beam.
To understand mechanics of thin-walled structures.
To know concept of dynamic measurement of deformation.

Evaluation of achievement

Part 1 (Prof. Mori): Reports of every week

Part 2 (Prof. Adachi): Examinations, 80 % and attendances, 20 %
Part 1 (Prof. Mori): Reports of every week

Part 2 (Prof. Adachi): Examinations, 80 % and attendances, 20 %

Examination

レポートで実施
By Report

Details of examination

Other information

Prof. Mori: room number: D-606, extension number: 6707
Prof. Adachi: Room D-305, Extension phone 6664, Email adachi@me.tut.ac.jp
Prof. Mori: room number: D-606, extension number: 6707
Prof. Adachi: Room D-305, Extension phone 6664, Email adachi@me.tut.ac.jp

Reference URL

Part(2) (Prof Adachi) http://solid.me.tut.ac.jp/solid/
Part(2) (Prof Adachi) http://solid.me.tut.ac.jp/solid/

Office hours

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

Relations to attainment objectives of learning and education

Key words

Strength of materials, Mechanics of materials, solid mechanics, Structural mechanics, Thin-walled Structure, Numerical methods, Forming processes
Strength of materials, Mechanics of materials, solid mechanics, Structural mechanics, Thin-walled Structure, Numerical methods, Forming processes

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

Subject name[English]	Advances in Mechanical Design[Advances in Mechanical Design]				
Schedule number	M41630330	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2+Spring1	**Day of the week,period**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	河村 庄造, 柴田 隆行 KAWAMURA Shozo, SHIBATA Takayuki				
Numbering					

Objectives of class

This class is separated into two parts:

Part 1 (Prof. Shibata):
The objectives of this course is to introduce fundamentals of micromachining technologies (microfabrication technologies), and their application in the development "Micro Electro Mechanical System (MEMS)" and "Micro Total Analysis System (μTAS)".

Part 2 (Prof. Kawamura):
The class aims to give basic knowledge on vibration engineering, in particular, on the modeling of multi-degree-of-freedom system and modal analysis.

This class is separated into two parts:

Part 1 (Prof. Shibata):
The objectives of this course is to introduce fundamentals of micromachining technologies (microfabrication technologies), and their application in the development "Micro Electro Mechanical System (MEMS)" and "Micro Total Analysis System (μTAS)".

Part 2 (Prof. Kawamura):
The class aims to give basic knowledge on vibration engineering, in particular, on the modeling of multi-degree-of-freedom system and modal analysis.

Contents of class

Part 1 (Prof. Shibata):
Micromachining Engineering
1. Introduction of MEMS and μTAS
2. Photolithography
3. Wet etching and Dry etching
4. Physical vapor deposition (PVD) and Chemical vapor deposition (CVD)
5. Plating and Electroforming
6. Bonding processes
7. Surface micromachining and Bulk micromachining
8. Presentation and discussion

Part 2 (Prof. Kawamura):
Vibration Engineering
1&2. Modeling of multi-degree-of-freedom system(MDOF system)
3&4. Modal analysis of MDOF system (eigenvalue analysis, etc.)
5-7. Modal analysis of MDOF system (Component mode synthesis method)

Part 1 (Prof. Shibata):
Micromachining Engineering
1. Introduction of MEMS and μTAS
2. Photolithography
3. Wet etching and Dry etching
4. Physical vapor deposition (PVD) and Chemical vapor deposition (CVD)
5. Plating and Electroforming
6. Bonding processes
7. Surface micromachining and Bulk micromachining
8. Presentation and discussion

Part 2 (Prof. Kawamura):
Vibration Engineering
1&2. Modeling of multi-degree-of-freedom system(MDOF system)
3&4. Modal analysis of MDOF system (eigenvalue analysis, etc.)
5-7. Modal analysis of MDOF system (Component mode synthesis method)

Self Preparation and Review

Part 1 (Prof. Shibata):
Students are required to prepare and review each lesson. Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
Part 1 (Prof. Shibata):
Students are required to prepare and review each lesson. Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/

Related subjects

Part 1 (Prof. Shibata):
A fundamental knowledge of physics and chemistry is required.

Part 2 (Prof. Kawamura):
Fundamental knowledge on vibration engineering and mathematics on linear algebra and ordinary differential equation, and engineering mechanics.
Part 1 (Prof. Shibata):
A fundamental knowledge of physics and chemistry is required.

Part 2 (Prof. Kawamura):
Fundamental knowledge on vibration engineering and mathematics on linear algebra and ordinary differential equation, and engineering mechanics.

Notes for textbook

Part 1 (Prof. Shibata): handout

Part 2 (Prof. Kawamura): handout
Part 1 (Prof. Shibata): handout

Part 2 (Prof. Kawamura): handout

Notes for reference

Part 1 (Prof. Shibata):
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
Reference: (1) M.J. Madou, "Fundamentals of Microfabrication, 2nd ed.", CRC Press, 2002. (2) S. Franssila, "Introduction to Microfabrication", John Wiley & Sons, 2004. (3) M. Gad-El-Hak, "The MEMS Handbook, 2nd ed.", CRC Pr I Llc, 2006.
Part 1 (Prof. Shibata):
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
Reference: (1) M.J. Madou, "Fundamentals of Microfabrication, 2nd ed.", CRC Press, 2002. (2) S. Franssila, "Introduction to Microfabrication", John Wiley & Sons, 2004. (3) M. Gad-El-Hak, "The MEMS Handbook, 2nd ed.", CRC Pr I Llc, 2006.

Goals to be achieved

Part (1) (Prof. Shibata)
To gain an understanding of the principles of micromachining technologies and to apply knowledge of the technologies to the design and manufacturing of a microdevice.

Part (2) (Prof. Kawamura)
get the basic knowledge on vibration engineering and some of their analytical methods.
Part (1) (Prof. Shibata)
To gain an understanding of the principles of micromachining technologies and to apply knowledge of the technologies to the design and manufacturing of a microdevice.

Part (2) (Prof. Kawamura)
get the basic knowledge on vibration engineering and some of their analytical methods.

Evaluation of achievement

Part 1 (Prof. Shibata):
Presentation (70%) and classroom performance (30%). An oral presentation on micromachining technologies for the fabrication of MEMS and μTAS devices will be imposed during the course of class.

Part 2 (Prof. Kawamura):
Some short reports during the class (30%) and a comprehensive report after final class (70%)
Part 1 (Prof. Shibata):
Presentation (70%) and classroom performance (30%). An oral presentation on micromachining technologies for the fabrication of MEMS and μTAS devices will be imposed during the course of class.

Part 2 (Prof. Kawamura):
Some short reports during the class (30%) and a comprehensive report after final class (70%)

Examination

レポートで実施
By Report

Details of examination

Other information

Prof. Shibata: Room number D-605, Extension phone 6693, E-mail shibata@me.tut.ac.jp
Prof. Kawamura: Room D-404, Extension phone 6674, E-mail kawamura@me.tut.ac.jp
Prof. Shibata: Room number D-605, Extension phone 6693, E-mail shibata@me.tut.ac.jp
Prof. Kawamura: Room D-404, Extension phone 6674, E-mail kawamura@me.tut.ac.jp

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

(E)国内外において活躍できる表現力・コミュニケーション力
技術文章，技術論文，口頭での報告・発表及び情報メディアを通じ，自分の論点や考え，研究成果などを国の内外に効果的に表現し，コミュニケーションする能力

Key words

Prof. Shibata: Microfabrication, Etching, Deposition, Plating, Bonding / Prof. Kawamura: vibration, modal analysis, Component modes Synthesis
Prof. Shibata: Microfabrication, Etching, Deposition, Plating, Bonding / Prof. Kawamura: vibration, modal analysis, Component modes Synthesis

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]				
Schedule number	M42610020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]				
Schedule number	M42610020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering					

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

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

Self Preparation and Review

Related subjects

Notes for textbook
Reference and material will be available from the supervisor.

Notes for reference

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

Evaluation of achievement
Presentation, Thesis,Coursework, and Outcomes are evaluated generally.

Examination
その他
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Electrical and Electronic Information Engineering[Thesis Research on Electrical and Electronic Information Engineering]				
Schedule number	M4261002T	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

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

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610040	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

The 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

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Methodology of R & D 2[Methodology of R & D 2]				
Schedule number	M42630110	**Subject area**	Advanced Electrical and Electronic Information 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	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework and presentation are evaluated generally.

Coursework and presentation are evaluated generally.

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Physics for Electronics 1[Physics for Electronics 1]				
Schedule number	M42630140	**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	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	石山 武, 松田 厚範, 服部 敏明, 高木 宏幸 ISHIYAMA Takeshi, MATSUDA Atsunori, HATTORI Toshiaki, TAKAGI Hiroyuki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

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

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

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

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

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

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

Self Preparation and Review

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

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

Related subjects

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

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

Textbook1	**Book title**	Physical Chemistry			**ISBN**	0198700725
	Author	Atkins	**Publisher**	Oxford University Press	**Publish year**	2006
Textbook2	**Book title**	Inorganic Chemistry			**ISBN**	0199264635
	Author	Shriver	**Publisher**	Oxford University Press	**Publish year**	2006

Notes for textbook

None

None

Notes for reference

Goals to be achieved

(1) To understand fundamental aspects on functional materials, photonics, electrodics and spin electronics.
(2) To get the knowledge on the latest technologies on these physical phenomena.

(1) To understand fundamental aspects on functional materials, photonics, electrodics and spin electronics.
(2) To get the knowledge on the latest technologies on these physical phenomena.

Evaluation of achievement

The final evaluation will be the sum of four categories (25%); functional materials, photonics, electrodics, spin electronics.

The final evaluation will be the sum of four categories (25%); functional materials, photonics, electrodics, spin electronics.

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Taking examination and submission of report will be explained and required by the teachers during their classes.

Taking examination and submission of report will be explained and required by the teachers during their classes.

Other information

Photonics; Takeshi Ishiyama: ishiyama@ee.tut.ac.jp
Functional materials; Atsunori Matuda : matsuda@ee.tut.ac.jp
Electrodics; Toshiaki Hattori : thattori@ee.tut.ac.jp
Spin electronics: Hiroyuki Takagi : takagi@ee.tut.ac.jp
Photonics; Takeshi Ishiyama: ishiyama@ee.tut.ac.jp
Functional materials; Atsunori Matuda : matsuda@ee.tut.ac.jp
Electrodics; Toshiaki Hattori : thattori@ee.tut.ac.jp
Spin electronics: Hiroyuki Takagi : takagi@ee.tut.ac.jp

Reference URL

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

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

Office hours

one hour after every classes

one hour after every classes

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Electrical Technology and Materials 1[Electrical Technology and Materials 1]				
Schedule number	M42630180	**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.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	須田 善行, 稲田 亮史, 村上 義信 SUDA Yoshiyuki, INADA Ryoji, MURAKAMI Yoshinobu				
Numbering					

Objectives of class

This lecture is implemented as an introduction to electrical energy systems and intended for students and other engineering disciplines. It is being useful as reference and self-study guide for the professional dealing with this important area. There are following three sub courses to choose from.

This lecture is implemented as an introduction to electrical energy systems and intended for students and other engineering disciplines. It is being useful as reference and self-study guide for the professional dealing with this important area. There are following three sub courses to choose from.

Contents of class

Sub Course 1(Y. suda)
1. Fundamental concept of electrical energy engineering
2. Three-phase systems
3. Power electronics

Sub Course 2(R. Inada)
1. Introduction of Electrochemical Energy Conversion Devices
2. Lithium-Ion Secondary Batteries
3. Recent Trend in Electrochemical Energy Conversion Devices

Sub Course 3(Yo. murakami)
1. Introduction of Electric Energy Systems
2. High Voltage Engineering and Electrical Insulation
3. Fundamental Properties of Dielectrics and Electrical Insulating Materials.

Sub Course 1(Y. suda)
1. Fundamental concept of electrical energy engineering
2. Three-phase systems
3. Power electronics

Sub Course 2(R. Inada)
1. Introduction of Electrochemical Energy Conversion Devices
2. Lithium-Ion Secondary Batteries
3. Recent Trend in Electrochemical Energy Conversion Devices

Sub Course 3(Yo. murakami)
1. Introduction of Electric Energy Systems
2. High Voltage Engineering and Electrical Insulation
3. Fundamental Properties of Dielectrics and Electrical Insulating Materials.

Self Preparation and Review

Related subjects

Basic electrical power engineering course is prerequisite.

Basic electrical power engineering course is prerequisite.

Notes for textbook

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

Notes for reference

Goals to be achieved

Evaluation of achievement

Marks are based on examinations(100%).

Marks are based on examinations(100%).

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

Reference URL

(1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley)
(2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag)
(3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes)

(1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley)
(2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag)
(3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes)

Office hours

Relations to attainment objectives of learning and education

Key words

(M42630220)LSI Process 1[LSI Process 1]

Subject name[English]	LSI Process 1[LSI Process 1]				
Schedule number	M42630220	**Subject area**	Advanced Electrical and Electronic Information 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	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	村上 裕二, 澤田 和明 MURAKAMI Yuji, SAWADA Kazuaki				
Numbering					

Objectives of class

From the viewpoint of deep understanding of LSI processes, semiconductors devices including material desgin and an example of latest device will be lectured.

From the viewpoint of deep understanding of LSI processes, semiconductors devices including material desgin and an example of latest device will be lectured.

Contents of class

Integrated circuits
Device processing
MEMS/NEMS
Latest MOS FETs
Current topics in IC/MEMS

Integrated circuits
Device processing
MEMS/NEMS
Latest MOS FETs
Current topics in IC/MEMS

Self Preparation and Review

Related subjects

The basic knowledge on the quantum mechanics, thermodynamics, and electronics are desirable.

Semiconductor Physics, Master course

The basic knowledge on the quantum mechanics, thermodynamics, and electronics are desirable.

Semiconductor Physics, Master course

Notes for textbook

Physics of Semiconducotr Devices
S.M.Sze, Willy

Physics of Semiconducotr Devices
S.M.Sze, Willy

Notes for reference

Goals to be achieved

(1) To understand fundamental aspects on LSI process, and semiconductor devices including material design.
(2) To get the knowledge on the latest technologies on LSI process.

(1) To understand fundamental aspects on LSI process, and semiconductor devices including material design.
(2) To get the knowledge on the latest technologies on LSI process.

Evaluation of achievement

Reports (50%) and Final examination (50%)

Reports (50%) and Final examination (50%)

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

Other information

K.Sawada (C-605)
sawada@ee.tut.ac.jp
Yu.Murakami (C-606)
ymurakami@ee.tut.ac.jp
K.Sawada (C-605)
sawada@ee.tut.ac.jp
Yu.Murakami (C-606)
ymurakami@ee.tut.ac.jp

Reference URL

http://www.tut.ac.jp/english/introduction/02EE.pdf
(department)

http://www.int.ee.tut.ac.jp/
(devision)

http://www.tut.ac.jp/english/research/research_highlights.html
(research activities)
http://www.tut.ac.jp/english/introduction/02EE.pdf
(department)

http://www.int.ee.tut.ac.jp/
(devision)

http://www.tut.ac.jp/english/research/research_highlights.html
(research activities)

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

Students select between the following two courses:
The first course is intended for learning how to design microwave circuits needed for advanced wireless communication systems and wireless power transmission systems. The distributed constant element theory is addressed to characterize linear circuits at high frequencies. Based on this technique, students challenge synthesis of a variety of microwave signal and power processing functions.
The second course is intended for learning the mechanism of medium access control and multi-hop communications for ad hoc and sensor networks. Students try to give solutions of the problems which cause performance degradation.
Students select between the following two courses:
The first course is intended for learning how to design microwave circuits needed for advanced wireless communication systems and wireless power transmission systems. The distributed constant element theory is addressed to characterize linear circuits at high frequencies. Based on this technique, students challenge synthesis of a variety of microwave signal and power processing functions.
The second course is intended for learning the mechanism of medium access control and multi-hop communications for ad hoc and sensor networks. Students try to give solutions of the problems which cause performance degradation.

Contents of class

Course 1 provided by Prof. Ohira:
1. Transmission lines
2. Scattering matrix
3. Mizuhashi Smith chart

Course 2 provided by Prof. Uehara:
1. Medium access control protocols
2. Multi-hop communications
3. Ad hoc and sensor networks

Course 1 provided by Prof. Ohira:
1. Transmission lines
2. Scattering matrix
3. Mizuhashi Smith chart

Course 2 provided by Prof. Uehara:
1. Medium access control protocols
2. Multi-hop communications
3. Ad hoc and sensor networks

Self Preparation and Review

Related subjects

Course 1:
Deep understanding on electromagnetic field theory, linear passive and reciprocal circuit theory, and sophisticated experience on complex and matrix mathematics are prerequisite.

Course 2:
The students who will take this course are supposed to have sufficient knowledge about the following; wireless digital

modulation and demodulation, radio propagation characteristic, signal processing, probability, random variables and stochastic process.
Course 1:
Deep understanding on electromagnetic field theory, linear passive and reciprocal circuit theory, and sophisticated experience on complex and matrix mathematics are prerequisite.

Course 2:
The students who will take this course are supposed to have sufficient knowledge about the following; wireless digital modulation and demodulation, radio propagation characteristic, signal processing, probability, random variables and stochastic process.

Notes for textbook

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

Course 2: Instruct in 1st class.
Course 1: Lecture on the blackboard without resorting to textbooks.

Course 2: Instruct in 1st class.

Notes for reference

Goals to be achieved

Course 1:
- Understand the distributed constant elements and concept of scattering matrix.
- Derive frequency responses on linear RF circuits exploiting Mizuhashi Smith chart.
- Characterize various kinds of high frequency functional circuits and compose them based upon given specifications.

Course 2:
- Understand the mechanism of medium access control and multi-hop communications
- Understand the characteristics of ad hoc and sensor networks
- Present a solution or a new application for the above

Course 1:
- Understand the distributed constant elements and concept of scattering matrix.
- Derive frequency responses on linear RF circuits exploiting Mizuhashi Smith chart.
- Characterize various kinds of high frequency functional circuits and compose them based upon given specifications.

Course 2:
- Understand the mechanism of medium access control and multi-hop communications
- Understand the characteristics of ad hoc and sensor networks
- Present a solution or a new application for the above

Evaluation of achievement

Course 1: Marks are based on the final test.

Course 2: Marks are based on reports and presentations.
Course 1: Marks are based on the final test.

Course 2: Marks are based on reports and presentations.

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

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

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words
microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element, wireless networks, medium access control, multi-hop
microwave, circuit, electromagnetic field, Smith chart, scattering matrix, distributed constant element, wireless networks, medium access control, multi-hop

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

Subject name[English]	Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]				
Schedule number	M43610010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
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 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

試験期間中には何も行わない
None during exam period

Details of examination

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

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

Subject name[English]	Seminar on Computer Science and Engineering II[Seminar on Computer Science and Engineering II]				
Schedule number	M43610020	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering					

Objectives of class
Contents of class
Self Preparation and Review
Related subjects
Notes for textbook
Notes for reference
Goals to be achieved
Evaluation of achievement
Examination 試験期間中には何も行わない None during exam period
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M43610030	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
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.

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M43610030	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S3系教務委員, 3系各教員 3kei kyomu Iin-S, 3kei kakukyouin				
Numbering					

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M4361003T	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 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 試験期間中には何も行わない None during exam period
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(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**	Fri.4 ～ 5,Tue.4 ～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 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.

A:greater than or equal to 80, B: greater than or equal to 65, C: greater than or equal to 55

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

A:greater than or equal to 80, B: greater than or equal to 65, C: greater than or equal to 55

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

情報・知能工学専攻

(B)技術者としての正しい倫理観と社会性

技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力

(D)広範囲の知識を有機的に連携させた研究開発方法論の体得

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

(E)国内外において活躍できる表現力・コミュニケーション力

論文，口頭及び情報メディアを通じて，自分の論点や考えなどを国の内外において効果的に表現し，コミュニケーションする能力とプレゼンテーションする能力

Key words

(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	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	関野　秀男, 栗田　典之, 後藤　仁志 SEKINO Hideo, KURITA Noriyuki, GOTO Hitoshi				
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

Preparation is must. Student cannot stay in the class if not prepared for the class in advance.
Preparation is must. Student cannot stay in the class if not prepared for the class in advance.

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

Examination

その他
Other

Details of examination

In each class, student must show the results of the research project assigned for each.
In each class, student must show the results of the research project assigned for each.

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

(M43630210)Advanced Chemoinformatics[Advanced Chemoinformatics]

Subject name[English]	Advanced Chemoinformatics[Advanced Chemoinformatics]				
Schedule number	M43630210	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	高橋　由雅, 加藤　博明 TAKAHASHI Yoshimasa, KATO Hiroaki				
Numbering					

Objectives of class

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

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

Contents of class

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships and knowledge aquisition
11.Visualization of higher dimensional data of molecules
12.Evaluation of structural similarity and its application
13.Fundamentals of machine learning
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Topics to be covered:

1.Structure and information of biomacromolecules
2.Transmission and expression of the genetic information
3.Molecular biology database
4.Sequence allignment by DP matching
5.Homology searching and multuiple allignment
6.Sequence motif and knowledge base
7.Tertiary structure classification and function prediction
8.Exam.
9.Chemical data space and multivariate data analysis
10.Quantitative structure-activity relationships and knowledge aquisition
11.Visualization of higher dimensional data of molecules
12.Evaluation of structural similarity and its application
13.Fundamentals of machine learning
14.Artificial neural network and chemical application
15.Support vector machine and chemical application
16.Exam.

Self Preparation and Review

Related subjects

Molecular Informatics, Linear Algebra, Elementary Analytics

Molecular Informatics, Linear Algebra, Elementary Analytics

Notes for textbook

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

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

Notes for reference

Goals to be achieved

First half term (by Kato)
/They understand structure and information of biomacromolecules.
/They learn the basic concept of molecular biology database and acquire the abilities of database retrieval.
/They understand knowledge discovery techniques from databases such as sequence alignment and motif searching.

Second half term (by Takahashi)
/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.
/They learn fundamentals of quantitative structure–activity relationships (QSAR)
/They learn mathematical basis of principal component analysis and visualization of multivariate chemical data space.
/They understanad usefulness and importance of structural similarity in intelligent molecular information processing.
/They learn mathematical basis of machine learning.
/Artificial neural network (ANN) and applicaton in chemistry.
/Support vector machine (SVM) and application in drug design and development.
They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

First half term (by Kato)
/They understand structure and information of biomacromolecules.
/They learn the basic concept of molecular biology database and acquire the abilities of database retrieval.
/They understand knowledge discovery techniques from databases such as sequence alignment and motif searching.

Second half term (by Takahashi)
/They understand regression analysis technique based on linear least squares method and the application to chemical data fitting.
/They learn fundamentals of quantitative structure–activity relationships (QSAR)
/They learn mathematical basis of principal component analysis and visualization of multivariate chemical data space.
/They understanad usefulness and importance of structural similarity in intelligent molecular information processing.
/They learn mathematical basis of machine learning.
/Artificial neural network (ANN) and applicaton in chemistry.
/Support vector machine (SVM) and application in drug design and development.
They acquire the abilities how they can apply the methods to chemical data analysis, data classification and prediction.

Evaluation of achievement

Reports and classroom performance 20%
Written examination 80%

Reports and classroom performance 20%
Written examination 80%

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Speech and Language Processing, Advanced[Speech and Language Processing, Advanced]				
Schedule number	M43630220	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	秋葉 友良, 山本 一公 AKIBA Tomoyoshi, YAMAMOTO Kazumasa				
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

(Yamamoto)

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

(Yamamoto)

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

Resumes will be provided, which are based on:

・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

・Kevin Knight
A Statistical MT Tutorial Workbook

Resumes will be provided, which are based on:

・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

・Kevin Knight
A Statistical MT Tutorial Workbook

Reference1	**Book title**	The application of hidden Markov models in speech recognition			**ISBN**	
	Author	M.Gales & S.Young	**Publisher**	World Scientific	**Publish year**	
Reference2	**Book title**	Introduction to Digital Speech Processing			**ISBN**	
	Author	L.R. Rabiner, R.W. Schafer	**Publisher**	World Scientific	**Publish year**	
Reference3	**Book title**	Modern Information Retrieval			**ISBN**	
	Author	Richado Baeza-Yates, Berthier Bibeiro-Neto	**Publisher**	Addison Wesley	**Publish year**	
Reference4	**Book title**	A Statistical MT Tutorial Workbook			**ISBN**	
	Author	Kevin Knight	**Publisher**		**Publish year**	

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 reports (100%).

Marks are based on reports (100%).

Examination

レポートで実施

By Report

Details of examination

Other information

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

Kazumasa Yamamoto: C-506, 44-6767, yamamoto@cs.tut.ac.jp

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

Kazumasa Yamamoto: C-506, 44-6767, yamamoto@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

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

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

Objectives of class

Data engineering technologies for the data (primarily on the Web) will be discussed.
Main emphasis is on the information retrieval and data mining technologies.
Data Mining technologies include principal component analysis, supervised learning such as classification, unsupervised learning such as clustering, and Web mining technologies.
Multimedia data processing will also be dsicussed.
Data engineering technologies for the data (primarily on the Web) will be discussed.
Main emphasis is on the information retrieval and data mining technologies.
Data Mining technologies include principal component analysis, supervised learning such as classification, unsupervised learning such as clustering, and Web mining technologies.
Multimedia data processing will also be dsicussed.

Contents of class

Classes will be held (theoretically) 7.5 times. The last time will be kept for the exam.

1. Information Retrieval
Fundamental techniques to construct a search system, including how to build indices, how to tokenize texts, and how to extract features from texts and images, will be considered.

2. Data and Web Mining
Fundamental methods for data mining as well as Web mining are discussed.

We plan to do one or two assignments for data mining techniques inside.

Please note that if this lecture is held at the same time with Japanese course, the lecture might be in Japanese.
Classes will be held (theoretically) 7.5 times. The last time will be kept for the exam.

1. Information Retrieval
Fundamental techniques to construct a search system, including how to build indices, how to tokenize texts, and how to extract features from texts and images, will be considered.

2. Data and Web Mining
Fundamental methods for data mining as well as Web mining are discussed.

We plan to do one or two assignments for data mining techniques inside.

Please note that if this lecture is held at the same time with Japanese course, the lecture might be in Japanese.

Self Preparation and Review

It is desirable to self-study as well as review fundamental data mining techniques such as clustering, classification, principal component analysis, and regression. It is recommended installing R/Python (also sometimes Java/C++) language into your computer, because some of the lecture materials are written in R/Python language. (R is favorable for simple visualization.)
It is desirable to self-study as well as review fundamental data mining techniques such as clustering, classification, principal component analysis, and regression. It is recommended installing R/Python (also sometimes Java/C++) language into your

computer, because some of the lecture materials are written in R/Python language. (R is favorable for simple visualization.)

Related subjects

Notes for textbook

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

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

Reference1	**Book title**	Information Retrieval, Implementing and Evaluating Search Engines			**ISBN**	978-0-262-02651-2
	Author	Stefan Buttcher, Charles L.A. Clarke, Gordon V. Cormack	**Publisher**	MIT Press	**Publish year**	2010
Reference2	**Book title**	Data Mining: Concepts and Techniques, Third Edition			**ISBN**	978-0-123-81479-1
	Author	Jiawei Han, Micheline Kamber, and Jian Pei	**Publisher**	Morgan Kaufmann	**Publish year**	2011
Reference3	**Book title**	Data Mining Practical Machine Learning Tools and Techniques, Third Edition			**ISBN**	978-0-12-374856-0
	Author	Ian H. Witten, Eibe Frank, and Mark A. Hall	**Publisher**	Morgan Kaufmann	**Publish year**	2011

Notes for reference

Reference #4
Title:「Modern Information Retrieval, the concepts and technology behind search, Second Edition」
Authors:Ricardo Baeza-Yates, Bertier Ribeiro-Neto
Publisher：Addison Wesley
ISBN：978-0-321-41691-9
Year：2011
Reference #5
Title:「Google's PageRank and Beyond」
Authors：Amy N. Langville, Carl D. Meyer
Publisher：Princeton University Press
ISBN：978-0-691-12202-1
Year：2006

Reference #4
Title:「Modern Information Retrieval, the concepts and technology behind search, Second Edition」
Authors:Ricardo Baeza-Yates, Bertier Ribeiro-Neto
Publisher：Addison Wesley
ISBN：978-0-321-41691-9
Year：2011
Reference #5
Title:「Google's PageRank and Beyond」
Authors：Amy N. Langville, Carl D. Meyer
Publisher：Princeton University Press
ISBN：978-0-691-12202-1
Year：2006

Goals to be achieved

To acquire the following knowledge that can make you
1. Implement fundamental data mining technologies.

2. Understand advanced technologies for information retrieval, including dimensional reduction.
3. Design, analyze, and evaluate the information retrieval and data mining technologies.
To acquire the following knowledge that can make you
1. Implement fundamental data mining technologies.
2. Understand advanced technologies for information retrieval, including dimensional reduction.
3. Design, analyze, and evaluate the information retrieval and data mining technologies.

Evaluation of achievement

Exercise (20%) and Final exam (80%)

A: (>=80), B: (>=65), C: (>= 55)

Exercise (20%) and Final exam (80%)

A: (>=80), B: (>=65), C: (>= 55)

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Masaki Aono (C-511) aono@tut.jp

Masaki Aono (C-511) aono@tut.jp

Reference URL

http://www.kde.cs.tut.ac.jp/~aono/myLecture.html
http://www.kde.cs.tut.ac.jp/~aono/myLecture.html

Office hours

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

Relations to attainment objectives of learning and education

Programming skills with Java, C++, R, and Python might be preferable.

Programming skills with Java, C++, R, and Python might be preferable.

Key words

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

Subject name[English]	Seminar on Environmental and Life Science I[Seminar on Environmental and Life Science I]				
Schedule number	M44610010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

Subject name[English]	Seminar on Environmental and Life Science II[Seminar on Environmental and Life Science II]				
Schedule number	M44610020	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 後藤　尚弘 4kei kyomu Iin-S, GOTOH Naohiro				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

Details of examination

Other information

Supervisor
Supervisor

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Supervisor

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor(s)
Supervisor(s)

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Seminar on Environmental and Life Science[Seminar on Environmental and Life Science]				
Schedule number	M44610040	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

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.

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Self Preparation and Review

Related subjects

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

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

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない
None during exam period

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

(M44630050)Applied Physical Chemistry I[Applied Physical Chemistry I]

Subject name[English]	Applied Physical Chemistry I[Applied Physical Chemistry I]				
Schedule number	M44630050	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	松本　明彦 MATSUMOTO Akihiko				
Numbering					

Objectives of class

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

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

Contents of class

[1] 1.Composite materials overview
[2] (Continued)
[3] 2.Formation of interface and interfacial free energy
[4] 3.Molecular interaction 3-1 Electrostatic interaction, 3-2 Orientation interaction,
[5] 3-3 Induced interaction 3-4 Dispersion interaction
[6] 4.Adsorption and related phenomena
[7] Control of interface interaction by regulation of the chemical structure of the interface
[8] Examination

[1] 1.Composite materials overview
[2] (Continued)
[3] 2.Formation of interface and interfacial free energy
[4] 3.Molecular interaction 3-1 Electrostatic interaction, 3-2 Orientation interaction,
[5] 3-3 Induced interaction 3-4 Dispersion interaction
[6] 4.Adsorption and related phenomena
[7] Control of interface interaction by regulation of the chemical structure of the interface
[8] Examination

Self Preparation and Review

Related subjects

Basic understanding on physical chemistry is desirable.

Basic understanding on physical chemistry is desirable.

Notes for textbook

Reference handouts will be provided in the class.

(Reference books)
[For molecular interaction]
1. Intermolecular and Surface Forces, 3rd Ed.: J. N. Israelachivili, Academic Press (2011).
2. Interface chemistry: D. H. Everett, Basic Principles of Colloid Science, Royal Society of Chemistry(1988).
3. Physical Chemistry of Surfaces, 7th Ed.: A. Adamson, Wiley-Intercience (1997), or its old edition.

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

(Reference books)
[For molecular interaction]
1. Intermolecular and Surface Forces, 3rd Ed.: J. N. Israelachivili, Academic Press (2011).
2. Interface chemistry: D. H. Everett, Basic Principles of Colloid Science, Royal Society of Chemistry(1988).
3. Physical Chemistry of Surfaces, 7th Ed.: A. Adamson, Wiley-Intercience (1997), or its old edition.

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

Notes for reference

Goals to be achieved

1) Understanding of basic structure and properties of composit materials
2) Understanding of molecular interaction
1) Understanding of basic structure and properties of composit materials
2) Understanding of molecular interaction

Evaluation of achievement

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

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

A. Matsumoto: room # B-505, E-mail: aki*at*ens.tut.ac.jp (Please replace "*at*" to "@" when e-mailing)
A. Matsumoto: room # B-505, E-mail: aki*at*ens.tut.ac.jp (Please replace "*at*" to "@" when e-mailing)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Applied Physical Chemistry II[Applied Physical Chemistry II]				
Schedule number	M44630060	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	松本　明彦 MATSUMOTO Akihiko				
Numbering					

Objectives of class

Adsorption is important in variety of fields such as materials separation, purification and catalysis. This course deals with fundamental aspect of adsorption especially gas adsorption on porous solids.

Adsorption is important in variety of fields such as materials separation, purification and catalysis. This course deals with fundamental aspect of adsorption especially gas adsorption on porous solids.

Contents of class

1.Introduction
2.Porous materials
3.Adsorption measurements
4.Characterization of porous solids by adsorption (Non-porous and macroporous materials)
5.Characterization of porous solids by adsorption (Microporous materials)
6.Characterization of porous solids by adsorption (Mesoporous materials)
7.Adsorption control of gases by regulation of pore surface
8.Examination

1.Introduction
2.Porous materials
3.Adsorption measurements
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7.Adsorption control of gases by regulation of pore surface
8.Examination

Self Preparation and Review

Related subjects

Basic understanding on physical chemistry is desirable.

Basic understanding on physical chemistry is desirable.

Notes for textbook

Reference handouts will be provided in the class.

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

2. S. Lowell et al., Characterization of Porous Solids and Powders, Kluwer (2004)

and other books related adsorption science.
Reference handouts will be provided in the class.

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

2. S. Lowell et al., Characterization of Porous Solids and Powders, Kluwer (2004)

and other books related adsorption science.

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

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

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

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Special Topics in Applied Organic Chemistry[Special Topics in Applied Organic Chemistry]				
Schedule number	M44630100	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.5～5	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	岩佐 精二, 柴富 一孝 IWASA Seiji, SHIBATOMI Kazutaka				
Numbering					

Objectives of class

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

Contents of class

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

1. Total synthesis of bioactive organic compounds. (Iwasa)
2. Advanced modern synthetic organic reactions using transition metals. (Iwasa)
3. Basic concept of oxidative addition and reductive elimination in catalytic cycles. (Iwasa)
4. Synthetic applications of asymmetric synthesis and asymmetric catalysts. (Iwasa)
5. Basic concept of Lewis acid catalyst and organocatalyst. (Shibatomi)
6. Advanced Lewis acid catalysis in organic synthesis. (Shibatomi)
7. Advanced organocatalysis in organic synthesis. (Shibatomi)
8. Organofluorine chemistry. (Shibatomi)

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

1. Total synthesis of bioactive organic compounds. (Iwasa)
2. Advanced modern synthetic organic reactions using transition metals. (Iwasa)
3. Basic concept of oxidative addition and reductive elimination in catalytic cycles. (Iwasa)
4. Synthetic applications of asymmetric synthesis and asymmetric catalysts. (Iwasa)
5. Basic concept of Lewis acid catalyst and organocatalyst. (Shibatomi)
6. Advanced Lewis acid catalysis in organic synthesis. (Shibatomi)
7. Advanced organocatalysis in organic synthesis. (Shibatomi)
8. Organofluorine chemistry. (Shibatomi)

Self Preparation and Review

Related subjects

Subjects related to Organic Chemistry
Subjects related to Organic Chemistry

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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Evaluation of achievement

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

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

Examination

レポートで実施
By Report

Details of examination

Other information

For more information:
Seiji Iwasa: room (B-506), e-mail (iwasa@ens.tut.ac.jp)
Kazutaka Shibatomi: room (B-507), e-mail (shiba@ens.tut.ac.jp)

For more information:
Seiji Iwasa: room (B-506), e-mail (iwasa@ens.tut.ac.jp)
Kazutaka Shibatomi: room (B-507), e-mail (shiba@ens.tut.ac.jp)

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

(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**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	吉田 祥子, 沼野 利佳 YOSHIDA Sachiko, NUMANO Rika				
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

S Yoshida,
(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

R Numano,
(8)Neural inducer in vertebrates
(9)Notch and Delta genes
(10)Polarity and Segmentation
(11)Hox gene function in the nervous system
(12)Genesis and Migration
(13)Cerebral cortex histogenesis
(14)Topic1
(15)Topic2 & Discussion

S Yoshida,
(1)Properties of neuronal cells
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(3)Chemical information transport
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(5)Detection of chemical information
(6)Detection of electrical information
(7)Detection of cortical development

R Numano,
(8)Neural inducer in vertebrates
(9)Notch and Delta genes
(10)Polarity and Segmentation
(11)Hox gene function in the nervous system
(12)Genesis and Migration
(13)Cerebral cortex histogenesis
(14)Topic1
(15)Topic2 & Discussion

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%

Term report; 100%
Short reports on Web; 40%, Term report; 60%

Term report; 100%

Examination

レポートで実施
By Report

Details of examination

Other information

S Yoshida
Room: B-406, E-mail:syoshida@ens.tut.ac.jp
R Numano
Room: G-304, E-mail:numano@tut.jp
S Yoshida
Room: B-406, E-mail:syoshida@ens.tut.ac.jp
R Numano
Room: G-304, E-mail:numano@tut.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**	Fri.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	髙島 和則, 田中 三郎, 水野 彰 TAKASHIMA Kazunori, TANAKA Saburo, MIZUNO Akira				
Numbering					

Objectives of class

静電気力やレーザを用いる DNA 分子や細胞の計測、操作が生命現象の解明に有用な手段であり、またラジカルを使う細胞やウイルスの制御は感染予防、さらには医療への応用が期待されている。このような学際的な 領域での技術開発を進めるには電気工学の基礎に加え細胞や分子の取り扱いなどの知識が必要であり、それらをこの講 義を通じて学ぶ。

Bio-manipulation of cells and genes is an important tool for life sciences. Control of microbes and viruses using radicals produced by plasma reduces infection of diseases and will possibly be applied in medical treatment. For these interdisciplinary developments, knowledge of cells and genes is required in addition to the basics of electrical engineering. These points are studied in this lecture.

静電気力やレーザを用いる DNA 分子や細胞の計測、操作が生命現象の解明に有用な手段であり、またラジカルを使う細胞やウイルスの制御は感染予防、さらには医療への応用が期待されている。このような学際的な 領域での技術開発を進めるには電気工学の基礎に加え細胞や分子の取り扱いなどの知識が必要であり、それらをこの講 義を通じて学ぶ。

Bio-manipulation of cells and genes is an important tool for life sciences. Control of microbes and viruses using radicals produced by plasma reduces infection of diseases and will possibly be applied in medical treatment. For these interdisciplinary developments, knowledge of cells and genes is required in addition to the basics of electrical engineering. These points are studied in this lecture.

Contents of class

1. 序論 (Introduction)

1.1 バイオ制御の目的 (Aim of Bio-molecule manipulation)

電気工学が細胞・遺伝子操作や計測にどのような役割を果たしているかを具体例をもとに理解する。 (Importance of electrical engineering and its application in bio-manipulation should be understood through several examples.)

・健康な環境の維持 (To maintain healthy environment)

・静電気力とプラズマによる微生物制御 (Bio-molecule manipulation by electrostatic force and plasma)

・新しい計測技術の開発 (Novel analytical method)

・ポストゲノム時代の遺伝子等の解析の重要性 (Importance of gene- sequencing in Post-Genome Era.)

1.2 電気を使う細胞や生体高分子制御の概要紹介 (Electrostatic method for manipulation of cells and molecules)

静電気力を使う細胞・分子操作の実例を学ぶ。 (Electrostatic manipulation of cells and molecules should be understood through several examples)

・電気泳動によるDNA配列解析 (Electrophoresis)

・静電微粒化によるセルソータ (Electro-spray and cell sorter)

・レーザと電界による・細胞・DNA一分子操作 (Manipulation of individual cells and DNA molecules)

・低温プラズマによる細胞・ウイルスの除去と破壊 (Destruction of microbes and viruses by non-thermal plasma)

2. 復習:静電気工学の基礎 (Basic of Electrostatics)

微小物体ならびに液体に働く静電気力と、それによる運動 に関する理論の理解を深める。特に制御対象物体の誘電分 極特性により力の方向が変わることなど、グレーディエント力の性質の理解を深める。 (Importance of electrical engineering and its application in bio-manipulation should be understood through several examples.)

2.1 静電気による力学現象 (Electrostatic force)

・クーロン力、影像力、グレーディエント力 重力、粘性力、磁気力との比較 (Coulomb force, image force, gradient force, comparison with gravity, drag, magnetic force)

2.2 電気流体力学 (Electro Fluid dynamics)
・電気ひずみ力、誘電泳動力、電気泳動力 (Electrophoresis, Electro-Osmosis, Dielectro-phoresis)
・マイクロ流路の流れの制御 (Flow control for micro- fluidics)

2.3 帯電液滴の発生と制御 (Generation and control of charged droplets)

3. 細胞操作と計測 (Manipulation of cells for analysis)
個々の細胞に対し、静電気力により運動制御を行うための 実際的な方法を理解する。また集光したレーザによる微小 粒子や細胞の捕捉に関し、その原理と実際の適用方法を知 る。あわせて細胞の融合や遺伝子導入の基礎として、細胞 の性質の概要、取り扱い方法の知識を得る。また細胞操作 の具体例として、細胞の分極、膜に加わる電界強度とそれによる膜破壊に関する知識を得る。 (Obtain the knowledge for manipulation of individual cells by electrostatic force and laser. Electrical characteristics of cells should be studied, including polarization and membrane breakdown by pulsed high electric field. Laser-tweezers and their practical applications should also be understood.)

3.1 細胞の観察 (Observation of cells)

3.2 細胞の電気的性質と静電気力による細胞操作 (Electrical characteristics of cells and manipulation by electrostatic force)
・電気泳動、誘電泳動、回転操作と生死判別 (Electrophoresis, Dielectro-phoresis, Cell rotation and detection of viability)

3.3 高電界の利用 (Application of High electric field)
・電気的細胞融合、細胞膜破壊 (Cell fusion, Punctuation of cell membrane)

3.4 レーザトラッピングによる細胞・分子操作 (Laser-tweezers for manipulation of cells and bio-molecules)

4. 生体高分子の操作技術 (Manipulation of single DNA molecules)
DNAの構造と性質、DNA複製、制限酵素の働きなど、 DNA情報をもとに生体が作られる際の基本的事項に関 し、理解を深める。また、この章ではDNA一分子を取り 扱う方法に関する知識を得る。 (Fundamentals of genes should be understood, which includes: Construction and nature of DNA, replication, activity of enzymes. Basic technique for manipulation of single DNA molecules should also be studied.)

4.1DNAの複製と相転移 (Phase-change and replication)

4.2DNA分子の可視化 (Visualization of DNA molecules)

4.3 染色体 DNA の取り出し、選別操作 (Extraction of DNA from single cell)

4.4DNA分子の伸張固定 (Fix in stretched shape)

4.5 制限酵素との反応と制限地図 (Restriction enzyme)

4.6DNA分子の切断加工ならびに PCR 増幅 (Cutting and PCR amplification of DNA)

4.7 マイクロ流路での反応・制御 (Micro fluidic system)

5. 復習:気体放電現象 (Review of ionized gas)
気体放電に関する基礎知識を整理し、大気圧低温プラズマ の発生方法、環境技術への応用に関する理解を深める。 (Fundamentals of ionized gases are reviewed. Generation of non-thermal plasma, and application in environmental remediation are studied.)

5.1 気体分子運動と電子衝突による電離、電子付着 (Ionization and electron attachment)

5.2 暗流と火花放電 (Dark current and spark discharge)
・タウンゼントの理論、パッシェンの法則、ストリーマ (Theory of gaseous breakdown: Townsend's theory, Paschen's law of

flashover streamer formation)

5.3　大気中の各種放電 (Gas discharge in atmospheric air)
・コロナ放電、バリア放電、沿面放電 (Corona, Barrier, Surface discharge)

5.4　電離によるラジカル生成と反応 (Generation of Radicals)
・酸化によるガス状汚染物質の浄化、微生物の殺菌 (Oxidation by radicals for cleaning of gaseous pollutants and sterilization)

5.5　安全に高電圧を取扱うために (Safety for High voltages)

6. 放電プラズマによる環境中微生物、ウイルスの制御 (Control of microbes and viruses by non-thermal plasma)
細胞やウイルスがプラズマにより受ける影響を知り、そのメカニズムを調べるための方法論に関する知識を得る。 (Effect of non-thermal plasma on cells and viruses is to be studied.)

6.1 プラズマ殺菌 (Sterilization by plasma)

6.2　ウイルスの破壊メカニズムの解明に向けて (Mechanism of the virus inactivation)

6.3　生体とプラズマとの相互作用の計測 (Interaction between plasma and bioparticles)

6.4　一分子DNAの切断頻度計測によるプラズマ暴露液 体などの安全性評価 (Evaluation of radical activity through the cutting rate of DNA molecules)

7. 展望 (Perspective)

7.1　DNA解析の高速化、一分子反応装置 (High speed sequencing and single molecule reactions)

7.2　バイオ制御と環境 (Bio-manipulation for reducing infection)

1. 序論 (Introduction)

1.1 バイオ制御の目的 (Aim of Bio-molecule manipulation)
電気工学が細胞・遺伝子操作や計測にどのような役割を果たしているかを具体例をもとに理解する。 (Importance of electrical engineering and its application in bio-manipulation should be understood through several examples.)
・健康な環境の維持 (To maintain healthy environment)
・静電気力とプラズマによる微生物制御 (Bio-molecule manipulation by electrostatic force and plasma)
・新しい計測技術の開発 (Novel analytical method)
・ポストゲノム時代の遺伝子等の解析の重要性 (Importance of gene- sequencing in Post-Genome Era.)

1.2 電気を使う細胞や生体高分子制御の概要紹介 (Electrostatic method for manipulation of cells and molecules)
静電気力を使う細胞・分子操作の実例を学ぶ。 (Electrostatic manipulation of cells and molecules should be understood through several examples)
・電気泳動によるDNA配列解析 (Electrophoresis)
・静電微粒化によるセルソータ (Electro-spray and cell sorter)
・レーザと電界による・細胞・DNA一分子操作 (Manipulation of individual cells and DNA molecules)
・低温プラズマによる細胞・ウイルスの除去と破壊 (Destruction of microbes and viruses by non-thermal plasma)

2. 復習：静電気工学の基礎 (Basic of Electrostatics)
微小物体ならびに液体に働く静電気力と、それによる運動 に関する理論の理解を深める。特に制御対象物体の誘電分 極特性

により力の方向が変わることなど、グレーディエント力の性質の理解を深める。(Importance of electrical engineering and its application in bio-manipulation should be understood through several examples.)

2.1 静電気による力学現象 (Electrostatic force)
・クーロン力、影像力、グレーディエント力 重力、粘性力、磁気力との比較 (Coulomb force, image force, gradient force, comparison with gravity, drag, magnetic force)

2.2 電気流体力学 (Electro Fluid dynamics)
・電気ひずみ力、誘電泳動力、電気泳動力 (Electrophoresis, Electro-Osmosis, Dielectro-phoresis)
・マイクロ流路の流れの制御 (Flow control for micro- fluidics)

2.3 帯電液滴の発生と制御 (Generation and control of charged droplets)

3. 細胞操作と計測 (Manipulation of cells for analysis)
個々の細胞に対し、静電気力により運動制御を行うための 実際的な方法を理解する。また集光したレーザによる微小 粒子や細胞の捕捉に関し、その原理と実際の適用方法を知 る。あわせて細胞の融合や遺伝子導入の基礎として、細胞 の性質の概要、取り扱い方法の知識を得る。また細胞操作 の具体例として、細胞の分極、膜に加わる電界強度とそれによる膜破壊に関する知識を得る。 (Obtain the knowledge for manipulation of individual cells by electrostatic force and laser. Electrical characteristics of cells should be studied, including polarization and membrane breakdown by pulsed high electric field. Laser-tweezers and their practical applications should also be understood.)

3.1 細胞の観察 (Observation of cells)

3.2 細胞の電気的性質と静電気力による細胞操作 (Electrical characteristics of cells and manipulation by electrostatic force)
・電気泳動、誘電泳動、回転操作と生死判別 (Electrophoresis, Dielectro-phoresis, Cell rotation and detection of viability)

3.3 高電界の利用 (Application of High electric field)
・電気的細胞融合、細胞膜破壊 (Cell fusion, Punctuation of cell membrane)

3.4 レーザトラッピングによる細胞・分子操作 (Laser-tweezers for manipulation of cells and bio-molecules)

4. 生体高分子の操作技術 (Manipulation of single DNA molecules)
DNAの構造と性質、DNA複製、制限酵素の働きなど、 DNA情報をもとに生体が作られる際の基本的事項に関 し、理解を深める。また、この章ではDNA一分子を取り 扱う方法に関する知識を得る。(Fundamentals of genes should be understood, which includes: Construction and nature of DNA, replication, activity of enzymes. Basic technique for manipulation of single DNA molecules should also be studied.)

4.1DNAの複製と相転移 (Phase-change and replication)

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4.4DNA分子の伸張固定 (Fix in stretched shape)

4.5 制限酵素との反応と制限地図 (Restriction enzyme)

4.6DNA分子の切断加工ならびに PCR 増幅 (Cutting and PCR amplification of DNA)

4.7 マイクロ流路での反応・制御 (Micro fluidic system)

5. 復習:気体放電現象 (Review of ionized gas)
気体放電に関する基礎知識を整理し、大気圧低温プラズマ の発生方法、環境技術への応用に関する理解を深める。(Fundamentals of ionized gases are reviewed. Generation of non-thermal plasma, and application in environmental remediation are studied.)

5.1 気体分子運動と電子衝突による電離、電子付着 (Ionization and electron attachment)

5.2　暗流と火花放電 (Dark current and spark discharge)
・タウンゼントの理論、パッシェンの法則、ストリーマ (Theory of gaseous breakdown: Townsend's theory, Paschen's law of flashover streamer formation)

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5.5　安全に高電圧を取扱うために (Safety for High voltages)

6. 放電プラズマによる環境中微生物、ウイルスの制御 (Control of microbes and viruses by non-thermal plasma)
細胞やウイルスがプラズマにより受ける影響を知り、そのメカニズムを調べるための方法論に関する知識を得る。 (Effect of non-thermal plasma on cells and viruses is to be studied.)

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6.2　ウイルスの破壊メカニズムの解明に向けて (Mechanism of the virus inactivation)

6.3　生体とプラズマとの相互作用の計測 (Interaction between plasma and bioparticles)

6.4　一分子DNAの切断頻度計測によるプラズマ暴露液 体などの安全性評価 (Evaluation of radical activity through the cutting rate of DNA molecules)

7. 展望 (Perspective)

7.1　DNA解析の高速化、一分子反応装置 (High speed sequencing and single molecule reactions)

7.2　バイオ制御と環境 (Bio-manipulation for reducing infection)

Self Preparation and Review

Related subjects

Notes for textbook
必要な文献等を配布する。
References will be distributed.
必要な文献等を配布する。
References will be distributed.

Notes for reference

Goals to be achieved

Evaluation of achievement
レポートにより評価する

Evaluated by reports.
レポートにより評価する
Evaluated by reports.

Examination
レポートで実施
By Report

Details of examination

Other information
連絡先:

水野彰　Email: mizuno@ens.tut.ac.jp, G 棟 607 号室, 内線 6904
田中三郎　Email: tanakas@ens.tut.ac.jp, G 棟 605 号室, 内線 6916
高島和則　Email: takashima@ens.tut.ac.jp, G 棟 310 号室, 内線 6921
連絡先:

水野彰　Email: mizuno@ens.tut.ac.jp, G 棟 607 号室, 内線 6904
田中三郎　Email: tanakas@ens.tut.ac.jp, G 棟 605 号室, 内線 6916
高島和則　Email: takashima@ens.tut.ac.jp, G 棟 310 号室, 内線 6921

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

Office hours

Relations to attainment objectives of learning and education

Key words

(M44630180)Advanced Reaction Engineering[Advanced Reaction Engineering]

Subject name[English]	Advanced Reaction Engineering[Advanced Reaction Engineering]				
Schedule number	M44630180	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring1 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	小口 達夫 OGUCHI Tatsuo				
Numbering					

Objectives of class

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

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Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

(Reference book)
Paul L. Houston, "Chemical Kinetics and Reaction Dynamics", McGrawHill.

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

(Reference book)
Paul L. Houston, "Chemical Kinetics and Reaction Dynamics", McGrawHill.

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

Notes for reference

Goals to be achieved

Understanding reaction rate theory, reaction mechanisms.

Understanding reaction rate theory, reaction mechanisms.

Evaluation of achievement

Grades for the course will be based on the reports.

Grades for the course will be based on the reports.

Examination

レポートで実施

By Report

Details of examination

Other information

Tatsuo Oguchi, Phone:6930

Tatsuo Oguchi, Phone:6930

Reference URL

Office hours

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

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

Relations to attainment objectives of learning and education

Physical chemistry and thermodynamics.

Physical chemistry and thermodynamics.

Key words

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

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

(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	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	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	後藤　尚弘, 東海林　孝幸 GOTOH Naohiro, TOKAIRIN Takayuki				
Numbering					

Objectives of class

Goto

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

Tokairin

The objectives of this class are

1 to know air pollution situation

2 to understand the evaluation method of pollutant concentration

3 to understand the characteristics of planetary boundary layer

Goto

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

Tokairin

The objectives of this class are

1 to know air pollution situation

2 to understand the evaluation method of pollutant concentration

3 to understand the characteristics of planetary boundary layer

Contents of class

Goto

1 Concept of Sustainable development

2 Material (Substance) flow analysis and Life Cycle Assessment

3 Japanese environmental law and institution

Tokairin

1 Atmospheric environment and air pollution

2 Atmospheric diffusion modeling

3 Meteorology of planetary boundary layer

Goto

1 Concept of Sustainable development

2 Material (Substance) flow analysis and Life Cycle Assessment

3 Japanese environmental law and institution

Tokairin

1 Atmospheric environment and air pollution

2 Atmospheric diffusion modeling
3 Meteorology of planetary boundary layer

Self Preparation and Review

Related subjects

Notes for textbook
Goto
I will distribute copies of document.

Tokairin
I will distribute copies of document.

Goto
I will distribute copies of document.

Tokairin
I will distribute copies of document.

Notes for reference

Goals to be achieved
Goto
to understant how to establish sustainable society

Tokairin
to understand basics on atmospheric environment and its evaluation method.

Goto
to understant how to establish sustainable society

Tokairin
to understand basics on atmospheric environment and its evaluation method.

Evaluation of achievement
Every week and Term end report (100%)

Every week and Term end report (100%)

Examination
レポートで実施
By Report

Details of examination

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

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

Reference URL

Office hours

Any time by E-mail
Any time by E-mail

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advanced Supercritical Fluid Engineering[Advanced Supercritical Fluid Engineering]				
Schedule number	M44630200	**Subject area**	Advanced 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	Environmental and Life Sciences			**Beggining grade**	M1, M2
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

レポートで実施
By Report

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	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 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.

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Self Preparation and Review

Related subjects

Advanced Life Science and Biotechnology I

Advanced Life Science and Biotechnology I

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

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

Molecular biology and microbiology, genomics, biotechnology and bioengineering

Molecular biology and microbiology, genomics, biotechnology and bioengineering

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

Subject name[English]	Advanced Environmental Technology II[Advanced Environmental Technology II]				
Schedule number	M44630240	**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	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 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.

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Self Preparation and Review

Related subjects

Advanced Environmental Technology I

Advanced Environmental Technology I

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

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

(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	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 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

Advanced Environmental and Ecological Systems I

Advanced Environmental and Ecological Systems I

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

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	X-ray Spectroscopy for Catalytic Engineering[X-ray Spectroscopy for Catalytic Engineering]				
Schedule number	M44630280	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	水嶋 生智 MIZUSHIMA Takanori				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Reports 100%

Reports 100%

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

Anytime

Anytime

Relations to attainment objectives of learning and education

Key words

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

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

(M44630290)Advanced Biomaterials Engineering[Advanced Biomaterials Engineering]

Subject name[English]	Advanced Biomaterials Engineering[Advanced Biomaterials Engineering]				
Schedule number	M44630290	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Spring2 term	**Day of the week,period**	Fri.5～5	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	手老 龍吾, 辻 秀人 TERO Ryugo, TSUJI Hideto				
Numbering					

Objectives of class

Biomaterials have been developed and studied in terms of various applications including biomedical, pharmaceutical and environmental applications. This course covers the fundamentals and applications of biomaterials and related experimental techniques.

Biomaterials have been developed and studied in terms of various applications including biomedical, pharmaceutical and environmental applications. This course covers the fundamentals and applications of biomaterials and related experimental techniques.

Contents of class

This course deals with all aspects of biobased and biodegradable polymers for biomedical, pharmaceutical, and environmental applications, and of devices and techniques for sensing biomolecules. The detailed course schedule is shown below. The detailed course schedule is shown below.

Biobased and biodegradable polymers (Hideto Tsuji):
(1) introduction, synthesis, and structures, (2) molding, crystallization, and physical properties, (3) hydrolytic degradation and biodegradation, and (4) applications.

Biodevice and biosensing (Ryugo Tero):
(5) introduction of biomaterials and biodevices, (6) detection of cell membrane functions, (7) surface patterning and microarray, and (8) imaging techniques for biomolecules.

This course deals with all aspects of biobased and biodegradable polymers for biomedical, pharmaceutical, and environmental applications, and of devices and techniques for sensing biomolecules. The detailed course schedule is shown below. The detailed course schedule is shown below.

Biobased and biodegradable polymers (Hideto Tsuji):
(1) introduction, synthesis, and structures, (2) molding, crystallization, and physical properties, (3) hydrolytic degradation and biodegradation, and (4) applications.

Biodevice and biosensing (Ryugo Tero):
(5) introduction of biomaterials and biodevices, (6) detection of cell membrane functions, (7) surface patterning and microarray, and (8) imaging techniques for biomolecules.

Self Preparation and Review

If possible, read the reference book chapters which are shown below and you can find them in the university library (Hideto Tsuji).
Read the appropriate chapter(s) of the reference book (#3) shown below. You can access it in the university network. (Ryugo Tero)

If possible, read the reference book chapters which are shown below and you can find them in the university library (Hideto Tsuji).
Read the appropriate chapter(s) of the reference book (#3) shown below. You can access it in the university network. (Ryugo Tero)

Related subjects

Notes for textbook

Printed materials will be distributed (Hideto Tsuji).

Printed materials will be distributed as necessary (Ryugo Tero).
Printed materials will be distributed (Hideto Tsuji).
Printed materials will be distributed as necessary (Ryugo Tero).

Reference1	**Book title**	Degradation of Poly (Lactide)-Based Biodegradable Materials			**ISBN**	1604565020
	Author	Hideto Tsuji	**Publisher**	Nova Science Pub Inc	**Publish year**	2008
Reference2	**Book title**	Chapter 21 in "Poly(lactic acid): Synthesis, Structures, Properties, Processing, and Applications"			**ISBN**	0470293667
	Author	Hideto Tsuji	**Publisher**	Wiley	**Publish year**	2010
Reference3	**Book title**	Nanoscience: Nanobiotechnology and Nanobiology			**ISBN**	978-3-540-88633-4
	Author	Patrick Boisseau & Marcel Lahmani	**Publisher**	Springer	**Publish year**	2009

Notes for reference
Reference book 3 (Ryugo Tero):
http://link.springer.com/book/10.1007%2F978-3-642-28030-6
Reference book 3 (Ryugo Tero):
http://link.springer.com/book/10.1007%2F978-3-642-28030-6

Goals to be achieved
To understand the fundamentals and applications of biobased and biodegradable polymers (Hideto Tsuji).
To understand the fundamentals and applications of biodevice, biosensing and related methods (Ryugo Tero).
To understand the fundamentals and applications of biobased and biodegradable polymers (Hideto Tsuji).
To understand the fundamentals and applications of biodevice, biosensing and related methods (Ryugo Tero).

Evaluation of achievement
Presentation (100%) regarding the biobased and biodegradable polymers (Hideto Tsuji)
Reporting assignment (100%) which will be given in each class (Ryugo Tero)
Presentation (100%) regarding the biobased and biodegradable polymers (Hideto Tsuji)
Reporting assignment (100%) which will be given in each class (Ryugo Tero)

Examination
レポートで実施
By Report

Details of examination
Presentation (Hideto Tsuji)
Reporting assignment (Ryugo Tero)
Presentation (Hideto Tsuji)
Reporting assignment (Ryugo Tero)

Other information
Room (G-606), e-mail (tsuji@ens.tut.ac.jp), phone: 6922 (Hideto Tsuji)
Room (B-405), e-mail (tero@tut.jp), phone: 6791 (Ryugo Tero)
Room (G-606), e-mail (tsuji@ens.tut.ac.jp), phone: 6922 (Hideto Tsuji)
Room (B-405), e-mail (tero@tut.jp), phone: 6791 (Ryugo Tero)

Reference URL

Office hours
Immediately after the class (Hideto Tsuji)
After the class, or as needed in my office (Ryugo Tero)
Immediately after the class (Hideto Tsuji)
After the class, or as needed in my office (Ryugo Tero)

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]				
Schedule number	M45610010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

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

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering II[Seminar on Architecture and Civil Engineering II]				
Schedule number	M45610020	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

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

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]				
Schedule number	M45610030	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

TBD by the laboratory

TBD by the laboratory

Notes for textbook

TBD by the laboratory

TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Refer to administration office.

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]				
Schedule number	M45610030	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering					

Objectives of class
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.

Self Preparation and Review

Related subjects
It depends on the laboratory

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
Evaluation is based on report.

Examination
その他
By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

Refer to administration office.

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]				
Schedule number	M45610040	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630110)Computer Applications in Urban Planning[Computer Applications in Urban Planning]

Subject name[English]	Computer Applications in Urban Planning[Computer Applications in Urban Planning]				
Schedule number	M45630110	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	浅野　純一郎 ASANO Junichiro				
Numbering					

Objectives of class

1) To gain the fundamental knowledge of computer applications in urban and regional planning.
2) To learn the advanced methods using computer technology for urban and regional planning.
1) To gain the fundamental knowledge of computer applications in urban and regional planning.
2) To learn the advanced methods using computer technology for urban and regional planning.

Contents of class

The major topics that will be addressed in this class are the followings.
1.Introduction: What is GIS (Geographic Information Systems); its function and applications
2.Overview of Advanced methods using computer technology in the field of urban planning
3.Application of Cellular Automata (CA) model to urban growth simulation modelling
4.Application of Expert system to land use planninng and environmental zoning
5.GIS-based planning support system for urban development in developing countries

Reporting some recent papers on computer applications: International Journal "Environment and Planning B: Planning and Design" and "Computers, Environment and Urban systems" will be used for reading papers.
The major topics that will be addressed in this class are the followings.
1.Introduction: What is GIS (Geographic Information Systems); its function and applications
2.Overview of Advanced methods using computer technology in the field of urban planning
3.Application of Cellular Automata (CA) model to urban growth simulation modelling
4.Application of Expert system to land use planninng and environmental zoning
5.GIS-based planning support system for urban development in developing countries

Reporting some recent papers on computer applications: International Journal "Environment and Planning B: Planning and Design" and "Computers, Environment and Urban systems" will be used for reading papers.

Self Preparation and Review

Related subjects

Basic knowledge of urban planning is desirable.
Basic knowledge of urban planning is desirable.

Notes for textbook

No textbook is required for this class. Some recent papers on computer applications to urban planning will be distributed.
No textbook is required for this class. Some recent papers on computer applications to urban planning will be distributed.

Notes for reference

Goals to be achieved

Evaluation of achievement

The report on selected papers will be imposed.
Oral presentation: 40%, Written report: 60%
The report on selected papers will be imposed.
Oral presentation: 40%, Written report: 60%

Examination

レポートで実施
By Report

Details of examination

Other information
Reference URL http://urban.ace.tut.ac.jp/ http://urban.ace.tut.ac.jp/
Office hours
Relations to attainment objectives of learning and education
Key words

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

Subject name[English]	Advanced Study on Housing System and Housing Policy[Advanced Study on Housing System and Housing Policy]				
Schedule number	M45630130	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	松島 史朗 MATSUSHIMA Shiro				
Numbering					

Objectives of class

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

Contents of class

This course takes several topics about the issues stated above. Two classes are allocated to each topic in principle; in the first class a lecture is given by the instructor and in the second class, the presentation is given by the student who is assigned to each topic.
It may adopt case method with which students are expected to read cases on various topics regarding emerging risks related to architectural
and housing planning, design, and urban development. Students read cases prior to the class and, at the class, they will exchange their ideas
face to face in order to develop their original idas to knowledge. It is also expected to develop skills of debating. Instructor will provide
appropriate instruction in timely manner for the class discussion along with giving lecture at the class.
1. Introduction
2/3. Architecture after 3.11
4/5. Lecture on Architectural and Housing Development of the World
6/7. Revitalising the City and Empowering. Community Tie by the Community (Re) Development in Toyokawa Inari Shrine
Mid-term paper due: proposal of the final project
8/9. Yebisu Garden Place
10. Final Project Interim Presentation and collective review
11/12. Rainbow Town Tokyo Waterfront Development
13. Independent Desk Crit
14/15. Final presentation by students.
16. Editing and compiling the final projects to make a booklet.
For the final project, students will write their own cases based on their research and give presentation at the last class. Final project may be either independent work or group project.
Because this is a small class and students have different backgrounds and interests, the contents of the class and schedule are subject to
change according to her/his disciplines.

This course takes several topics about the issues stated above. Two classes are allocated to each topic in principle; in the first class a lecture is given by the instructor and in the second class, the presentation is given by the student who is assigned to each topic.
It may adopt case method with which students are expected to read cases on various topics regarding emerging risks related to architectural
and housing planning, design, and urban development. Students read cases prior to the class and, at the class, they will

exchange their ideas
face to face in order to develop their original idas to knowledge. It is also expected to develop skills of debating. Instructor will provide
appropriate instruction in timely manner for the class discussion along with giving lecture at the class.
1. Introduction
2/3. Architecture after 3.11
4/5. Lecture on Architectural and Housing Development of the World
6/7. Revitalising the City and Empowering. Community Tie by the Community (Re) Development in Toyokawa Inari Shrine
Mid-term paper due: proposal of the final project
8/9. Yebisu Garden Place
10. Final Project Interim Presentation and collective review
11/12. Rainbow Town Tokyo Waterfront Development
13. Independent Desk Crit
14/15. Final presentation by students.
16. Editing and compiling the final projects to make a booklet.
For the final project, students will write their own cases based on their research and give presentation at the last class. Final project may be either independent work or group project.
Because this is a small class and students have different backgrounds and interests, the contents of the class and schedule are subject to
change according to her/his disciplines.

Self Preparation and Review

Read a case and prepare for the answers to each question on the case.
Develop your own ideas in order to exchange them w/ your class mates to have more diverse views
From the review of your project, you may revise and develop your argument for the future. Reflecting yourself by listening to others is the most important aspect to become a good practitioner.

Read a case and prepare for the answers to each question on the case.
Develop your own ideas in order to exchange them w/ your class mates to have more diverse views
From the review of your project, you may revise and develop your argument for the future. Reflecting yourself by listening to others is the most important aspect to become a good practitioner.

Related subjects

Architectural/Civil Engineering practice experience preferred but not required.

Architectural/Civil Engineering practice experience preferred but not required.

Notes for textbook

Cases shown above. Cases are subject to change.

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

(Reference)
TBA

Notes for reference

Because this field is getting important more than ever before, there are some new books available and students are encouraged to search for the up-dated information probably via internet.
Because this field is getting important more than ever before, there are some new books available and students are encouraged to search for the up-dated information probably via internet.

Goals to be achieved

To understand the needs or structure for humanity that involves various issues including design, procurement, and distribution systems of architecture from international point of view and from local standpoint.
To develop your own ideas and your ability of discussion based on the comparative research of your country and Japan about the problems discussed here.

To understand the needs or structure for humanity that involves various issues including design, procurement, and distribution systems of architecture from international point of view and from local standpoint.
To develop your own ideas and your ability of discussion based on the comparative research of your country and Japan about

the problems discussed here.

Evaluation of achievement

Class participation (30%), final project of case writing (40%) , presentation by the students (30%), and contributiron to make the booklet that features the final projects (10%)

Class participation (30%), final project of case writing (40%) , presentation by the students (30%), and contributiron to make the booklet that features the final projects (10%)

Examination

その他

Other

Details of examination

Other information

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

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

Reference URL

http://mlab.ace.tut.ac.jp/

http://mlab.ace.tut.ac.jp/

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Structural System Planning and Design II[Advanced Structural System Planning and Design II]				
Schedule number	M45630200	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

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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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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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Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Building and Urban Thermal Environment[Building and Urban Thermal Environment]				
Schedule number	M45630260	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**		**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Building Scinece

Building Scinece

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
Report

Report

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Details of examination

Other information
D-711
D-711

Reference URL

Office hours
Thursday

Thursday

Relations to attainment objectives of learning and education

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

(M45630280)Advanced Architectural Planning[Advanced Architectual Planning]

Subject name[English]	Advanced Architectural Planning[Advanced Architectual Planning]				
Schedule number	M45630280	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Spring term	**Day of the week,period**	Mon.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	垣野　義典 KAKINO Yoshinori				
Numbering					

Objectives of class

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

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

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

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

Contents of class

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

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

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

Self Preparation and Review

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

計画序論
建築設計演習ⅠからⅥ
建築設計演習基礎

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

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

Please refer them(sorry, Japanese only).

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

Notes for reference

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

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

Examination
レポートで実施
By Report

Details of examination

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

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

Office hours

Relations to attainment objectives of learning and education

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

(M45630320)Water Environment Engineering II[Water Environment Engineering II]

Subject name[English]	Water Environment Engineering II[Water Environment Engineering II]				
Schedule number	M45630320	**Subject area**	Advanced Architecture and Civil 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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	井上 隆信 INOUE Takanobu				
Numbering					

Objectives of class

To know and understand the water quality change in environment and treatment system.
To know and understand drinking water treatment and waste water treatment.

To know and understand the water quality change in environment and treatment system.
To know and understand drinking water treatment and waste water treatment.

Contents of class

Water pollutants in water environment
1) nutrients, Organic matter
2) chemicals in water environment

water quality change in environment and treatment system.
1) fundamental equation of the mass balance
2) piston flow model
3) complete mixing model
4) reaction rate

drinking water treatment and waste water treatment
1) rapid sand filtration process
2) activated sludge treatment process

Water pollutants in water environment
1) nutrients, Organic matter
2) chemicals in water environment

water quality change in environment and treatment system.
1) fundamental equation of the mass balance
2) piston flow model
3) complete mixing model
4) reaction rate

drinking water treatment and waste water treatment
1) rapid sand filtration process
2) activated sludge treatment process

Self Preparation and Review

Related subjects

Notes for textbook

No textbook is required for this class.

No textbook is required for this class.

Notes for reference

Goals to be achieved

To understand the water pollution and environmental quality standard.

To understand the water pollution and environmental quality standard.

Evaluation of achievement

Reports

Reports

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

Wednesday 12:00- 13:00

Wednesday 12:00- 13:00

Relations to attainment objectives of learning and education

Key words