Syllabus

International Master′s Degree Program

（2015-Fall Term）

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

Subject name[English]	Culture and Communication II[Culture and Communication II]				
Schedule number	M40030040	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Common			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	池松　峰男 IKEMATSU Mineo				
Numbering					

Objectives of class

After completing the course, students should be able to discern there is no decisive methods for language learning, but a consensus on the need of large amount of input.

After completing the course, students should be able to discern there is no decisive methods for language learning, but a consensus on the need of large amount of input.

Contents of class

Weeks:
1. Introduction / Language, Learning and Teaching 1
2. Language, Learning and Teaching 2
3. First Language Acquisition 1
4. First Language Acquisition 2
5. Age and Acquisition 1
6. Age and Acquisition 2
7. Human Learning
8. Styles and Strategies
9. Personality Factors
10. Sociocultural Factors
11. Catch up
12. Cross-Linguistic Influence
13. Communicative Competence
14. Second Language Acquisition -General-
15. Second Language Acquisition -The Input Hypothesis-

Weeks:
1. Introduction / Language, Learning and Teaching 1
2. Language, Learning and Teaching 2
3. First Language Acquisition 1
4. First Language Acquisition 2
5. Age and Acquisition 1
6. Age and Acquisition 2
7. Human Learning
8. Styles and Strategies
9. Personality Factors
10. Sociocultural Factors
11. Catch up
12. Cross-Linguistic Influence
13. Communicative Competence
14. Second Language Acquisition -General-
15. Second Language Acquisition -The Input Hypothesis-

Self Preparation and Review

Download and use the materials on a cloud drive. Material-uploading will be done before each class and occasionally after the

class when needed. Details on preparation will be given at the beginning of the course.
Download and use the materials on a cloud drive. Material-uploading will be done before each class and occasionally after the class when needed. Details on preparation will be given at the beginning of the course.

Related subjects

Notes for textbook

Reference1	**Book title**	Principles of Language Learning and Teaching			**ISBN**	0-13-017816-0
	Author	Brown, H. Douglas	**Publisher**	Longman	**Publish year**	2000
Reference2	**Book title**	Second Language Acquisition			**ISBN**	0-19-437212 X
	Author	Ellis, Rod	**Publisher**	Oxford University Press	**Publish year**	1997
Reference3	**Book title**	A Cognitive Approach to language Learning			**ISBN**	0-19-437217-0
	Author	Skehan, Peter	**Publisher**	Oxford University Press	**Publish year**	1998

Notes for reference

Goals to be achieved
To introduce what has been done for second language acquisition research.
To introduce the lack of decisive method for language learning.
To examine the validity of the Input Hypothesis.
To introduce what has been done for second language acquisition research.
To introduce the lack of decisive method for language learning.
To examine the validity of the Input Hypothesis.

Evaluation of achievement
Assessment will be based on coursework (80%), and attendance (20%).
・4 pieces of written coursework (essay) with 300 words or over to be submitted by the relevant deadline.

≧80 点：A、≧65 点：B、≧55 点：C （including all the goals shown above）
Assessment will be based on coursework (80%), and attendance (20%).
・4 pieces of written coursework (essay) with 300 words or over to be submitted by the relevant deadline.

≧80 点：A、≧65 点：B、≧55 点：C （including all the goals shown above）

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
Drop-in basis
Drop-in basis

Relations to attainment objectives of learning and education
(A)幅広い人間性と考え方
人間社会を地球的な視点から多面的にとらえ，自然と人間との共生，人類の幸福・健康・福祉について考える能力

(A)幅広い人間性と考え方
人間社会を地球的な視点から多面的にとらえ，自然と人間との共生，人類の幸福・健康・福祉について考える能力

Key words

Second Language (L2) Acquisition, Language Leaning, Language Teaching
Second Language (L2) Acquisition, Language Leaning, Language Teaching

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

Subject name[English]	Seminar on Mechanical Engineering I[Seminar on Mechanical Engineering I]				
Schedule number	M41610010	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, 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 seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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

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

Subject name[English]	Seminar on Mechanical Engineering II[Seminar on Mechanical Engineering II]				
Schedule number	M41610020	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	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 seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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

(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

(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～
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 a deep understanding of relevant knowledge.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

その他
Other

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, 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 a deep understanding of relevant knowledge.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

その他
Other

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Mechanical Engineering[Seminar on Mechanical Engineering]				
Schedule number	M41610040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	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 seminar aims to provide a broad understanding of the mechanical engineering available for the master thesis research of a student.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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

(M41610050)Internship[Internship]

Subject name[English]	Internship[Internship]				
Schedule number	M41610050	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	0
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	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

(M41630040)Micromachining Engineering[Micromachining Engineering]

Subject name[English]	Micromachining Engineering[Micromachining Engineering]				
Schedule number	M41630040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering					

Objectives of class

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 (μ TAS)".
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 (μ TAS)".

Contents of class

1. Introduction of MEMS and μ TAS
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

1. Introduction of MEMS and μ TAS
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

Self Preparation and Review

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

Related subjects

A fundamental knowledge of physics and chemistry is required.
A fundamental knowledge of physics and chemistry is required.

Notes for textbook

No textbook is required for this class.
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
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Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/

Reference1	**Book title**	Fundamentals of Microfabrication (2nd ed.): The Science of Miniaturization			**ISBN**	
	Author	M.J. Madou	**Publisher**	CRC Press	**Publish year**	2002
Reference2	**Book title**	Introduction to Microfabrication			**ISBN**	
	Author	S. Franssila	**Publisher**	John Wiley & Sons	**Publish year**	2004
Reference3	**Book title**	The MEMS Handbook (2nd ed.)			**ISBN**	
	Author	M. Gad-El-Hak	**Publisher**	CRC Pr I Llc	**Publish year**	2006

Notes for reference

Goals to be achieved

- To gain an understanding of the fundamentals of micromachining technologies for MEMS and μTAS
- To apply knowledge of micromachining technologies to the design and manufacturing of microdevices

- To gain an understanding of the fundamentals of micromachining technologies for MEMS and μTAS
- To apply knowledge of micromachining technologies to the design and manufacturing of microdevices

Evaluation of achievement

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.

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.

Examination

その他

Other

Details of examination

An oral presentation on micromachining technologies will be imposed during the course of class.

An oral presentation on micromachining technologies will be imposed during the course of class.

Other information

Takayuki Shibata: room D-605, E-mail: shibata@me.tut.ac.jp

Takayuki Shibata: room D-605, E-mail: shibata@me.tut.ac.jp

Reference URL

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Time-frequency Analysis and Wavelet Transform[Time-frequency Analysis and Wavelet Transform]				
Schedule number	M41630120	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	章 忠 SHO Tadashi				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Basic knowledge of the signal analysis

Basic knowledge of the signal analysis

Notes for textbook

Materials will be perpared by lecturer.

Materials will be perpared by lecturer.

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

Wavelet transform, Time-frequency analysis

Wavelet transform, Time-frequency analysis

(M41630170)Advanced Applied Fluid Engineering[Advanced Applied Fluid Engineering]

Subject name[English]	Advanced Applied Fluid Engineering[Advanced Applied Fluid Engineering]				
Schedule number	M41630170	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	柳田　秀記 YANADA Hideki				
Numbering					

Objectives of class

The class treats the dynamics of fluid in a pipe, which is a typical distributed parameter system. The primary objectives of the class are to understand transient phenomena in a pipe, the theories that describe the dynamic behaviors of fluid, and the methods to analyze them.

The class treats the dynamics of fluid in a pipe, which is a typical distributed parameter system. The primary objectives of the class are to understand transient phenomena in a pipe, the theories that describe the dynamic behaviors of fluid, and the methods to analyze them.

Contents of class

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

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

Self Preparation and Review

Related subjects

Fluid mechanics, Mechanics, Laplace transform

Fluid mechanics, Mechanics, Laplace transform

Notes for textbook

Printed materials are given.

Printed materials are given.

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

Notes for reference

Goals to be achieved

To understand the transient phenomena that occur in a pipe.
To understand the fundamental theories that describe the dynamic behaviors of fluid in a pipe.

To understand the transient phenomena that occur in a pipe.
To understand the fundamental theories that describe the dynamic behaviors of fluid in a pipe.

Evaluation of achievement

Written reports:50%, Examination:50%
Written reports:50%, Examination:50%

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Room: D309, E-mail: yanada@me.tut.ac.jp
Room: D309, E-mail: yanada@me.tut.ac.jp

Reference URL

Office hours

Basically, every time is OK. The time for discussion can be determined through e-mails when the lecturer is abscent from his office.
Basically, every time is OK. The time for discussion can be determined through e-mails when the lecturer is abscent from his office.

Relations to attainment objectives of learning and education

Key words

(M41630190)Applied Combustion Engineering[Applied Combustion Engineering]

Subject name[English]	Applied Combustion Engineering[Applied Combustion Engineering]				
Schedule number	M41630190	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	野田　進 NODA Susumu				
Numbering					

Objectives of class

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

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

Contents of class

1.Introduction
2.Premixed combustion
3.Nonpremixed combustion
4.Turbulent combustion
5.Statistical description of turbulent combustion
6.Flamelet model
7.Probability density function(pdf) model
8.Examination

This class ought to open in alternate years, thus see the teaching schedule.

1.Introduction
2.Premixed combustion
3.Nonpremixed combustion
4.Turbulent combustion
5.Statistical description of turbulent combustion
6.Flamelet model
7.Probability density function(pdf) model
8.Examination

This class ought to open in alternate years, thus see the teaching schedule.

Self Preparation and Review

Related subjects

Fundamental knowledge of the fluid dynamics is required, but the statistics and the stochastics will be lectured with basic contents.

Fundamental knowledge of the fluid dynamics is required, but the statistics and the stochastics will be lectured with basic contents.

Notes for textbook

Prints will be distributed.

Prints will be distributed.

Reference1	**Book title**	Principles of Combustion			**ISBN**	0-471-04689-2
	Author	Kuo,K.K.	**Publisher**	John Wiley & Sons	**Publish year**	2005

Notes for reference

Goals to be achieved

Governing equations of turbulent combustion are derivable from fundamental equations.

Governing equations of turbulent combustion are derivable from fundamental equations.

Evaluation of achievement

Evaluation is based on an examination and reports.

Evaluation is based on an examination and reports.

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

http://www.mech.tut.ac.jp/~noda/

http://www.mech.tut.ac.jp/~noda/

Office hours

Any time in afternoon

Any time in afternoon

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Mechanical Systems Design I[Advanced Mechanical Systems Design I]				
Schedule number	M41630210	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

Experience research, design and development in industries, and understand problem formulation and solving strategies in practical applications. Cultivate a rich humanity for being an engineer who can take the leadership of a project through close communication with an internship supervisor.

Experience research, design and development in industries, and understand problem formulation and solving strategies in practical applications. Cultivate a rich humanity for being an engineer who can take the leadership of a project through close communication with an internship supervisor.

Contents of class

Participate in research, design and development projects in industries that are suitable for master's program studies under supervision by industrial engineers or managers.

Participate in research, design and development projects in industries that are suitable for master's program studies under supervision by industrial engineers or managers.

Self Preparation and Review

Prepare well for internship projects by contacting industrial supervisors.

Prepare well for internship projects by contacting industrial supervisors.

Related subjects

Depend on participating internship projects.

Depend on participating internship projects.

Notes for textbook

May be prepared by participating industries.

May be prepared by participating industries.

Notes for reference

Goals to be achieved

Acquire communication skills for completing projects and application skills of materials studied in other courses, and understand their importance.

Acquire communication skills for completing projects and application skills of materials studied in other courses, and understand their importance.

Evaluation of achievement

Determined based on internship project evaluation sheets, internship project reports, survey reports of internship project and internship project presentation.

A: 80 or over (out of 100)

B: 65-79

C: 55-64

Determined based on internship project evaluation sheets, internship project reports, survey reports of internship project and internship project presentation.

A: 80 or over (out of 100)

B: 65-79

C: 55-64

Examination

その他

Other

Details of examination

Submission of internship project reports and presentation are required.

Submission of internship project reports and presentation are required.

Other information

Contact Uchiyama by e-mail for inquiry.

Contact Uchiyama by e-mail for inquiry.

Reference URL

Office hours

Contact Uchiyama by e-mail first.

Contact Uchiyama by e-mail first.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Materials and Manufacturing Process I[Advanced Materials and Manufacturing Process I]				
Schedule number	M41630230	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, 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

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

Subject name[English]	Advanced System, Control and Robotics I[Advanced System, Control and Robotics I]				
Schedule number	M41630250	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, 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

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

Subject name[English]	Advanced Energy and Environmental Engineering I[Advanced Energy and Environmental Engineering I]				
Schedule number	M41630270	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, 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

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

Subject name[English]	Properties and Applications of Engineering Materials[Properties and Applications of Engineering Materials]				
Schedule number	M41630320	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	三浦　博己 MIURA Hiromi				
Numbering					

Objectives of class

Understanding of properties and applications of engineering materials

Understanding of properties and applications of engineering materials

Contents of class

1. Engineering materials and manufacturing processes
2. Crystal structures
3. Defects in crystals
4. Diffusion in sold
5. Phase diagrams of alloys
6. Strengthening of metallic materials
7. Composites
8. Exam.

1. Engineering materials and manufacturing processes
2. Crystal structures
3. Defects in crystals
4. Diffusion in sold
5. Phase diagrams of alloys
6. Strengthening of metallic materials
7. Composites
8. Exam.

Self Preparation and Review

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

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

Related subjects

Notes for textbook

Lecture using ppt.

Lecture using ppt.

Reference1	**Book title**	Materials science and engineering			**ISBN**	978-1-118-31922-2
	Author	W.D.Callister Jr and D.G.Rethwisch	**Publisher**	Willy	**Publish year**	20174
Reference2	**Book title**	Foundations of materials science and engineering			**ISBN**	978-007-131114-4
	Author	W.F. Smith and J.Hashemi	**Publisher**	Mc Graw Hill	**Publish year**	2011

Notes for reference

Goals to be achieved

Understanding of properties and applications of engineering materials explained in the lectures

Understanding of properties and applications of engineering materials explained in the lectures

Evaluation of achievement

Short tests 50%, Final exam. 50%

Short tests 50%, Final exam. 50%

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

Hiromi Miura:

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

Hiromi Miura:

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

Reference URL

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

(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

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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

(M41630350)Advances in Thermal and Fluid Mechanics[Advances in Thermal and Fluid Mechanics]

Subject name[English]	Advances in Thermal and Fluid Mechanics[Advances in Thermal and Fluid Mechanics]				
Schedule number	M41630350	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.1～2	**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]	野田　進, 柳田　秀記 NODA Susumu, YANADA Hideki				
Numbering					

Objectives of class

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

Applied fluid engineering by Prof.Yanada:
The class treats the dynamics of fluid in a pipe, which is a typical distributed parameter system. The primary objectives of the class are to understand transient phenomena in a pipe, the theories that describe the dynamic behaviors of fluid, and the methods to analyze them.

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

Applied fluid engineering by Prof.Yanada:
The class treats the dynamics of fluid in a pipe, which is a typical distributed parameter system. The primary objectives of the class are to understand transient phenomena in a pipe, the theories that describe the dynamic behaviors of fluid, and the methods to analyze them.

Contents of class

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

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

This class ought to open in alternate years, thus see the teaching schedule.
Applied Combustion Engineering by Professor Noda:
1.Introduction
2.Premixed combustion

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

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

This class ought to open in alternate years, thus see the teaching schedule.

Self Preparation and Review

Related subjects

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

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

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

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

Notes for textbook

Prints will be distributed.

Prints will be distributed.

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

Notes for reference

Goals to be achieved

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

Applied fluid engineering by Prof.Yanada:
To understand the transient phenomena that occur in a pipe.
To understand the fundamental theories that describe the dynamic behaviors of fluid in a pipe.

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

Applied fluid engineering by Prof.Yanada:
To understand the transient phenomena that occur in a pipe.

To understand the fundamental theories that describe the dynamic behaviors of fluid in a pipe.

Evaluation of achievement

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

Applied fluid engineering by Prof.Yanada:
Written reports:50%, Examination:50%

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

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

Applied fluid engineering by Prof.Yanada:
Written reports:50%, Examination:50%

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

Examination

レポートで実施
By Report

Details of examination

Other information

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

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

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

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

Reference URL

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

(M41630380)Robotics[Robotics]

Subject name[English]	Robotics[Robotics]				
Schedule number	M41630380	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Read the handouts before the lecture.

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra, mechanics and control theory.

Fundamentals of linear algebra, mechanics and control theory.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

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

Notes for reference

Goals to be achieved

Be able to derive kinematics and dynamics of robotic manipulators.

Be able to design motion controllers for robotic manipulators.

Be able to derive kinematics and dynamics of robotic manipulators.

Be able to design motion controllers for robotic manipulators.

Evaluation of achievement

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

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

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

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

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

(M41630400)Robot Kinematics[Robot Kinematics]

Subject name[English]	Robot Kinematics[Robot Kinematics]				
Schedule number	M41630400	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Read the handouts before the lecture.

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra and mechanics.

Fundamentals of linear algebra and mechanics.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

Reference1	**Book title**	Introduction to Robotics: Mechanics and Control, 3rd Edition			**ISBN**	
	Author	J. J. Craig	**Publisher**	Prentice Hall	**Publish year**	2005

Reference2	Book title	Robot Modeling and Control			ISBN	
	Author	M. W. Spong, S. Hutchinson, M. Vidyasagar	Publisher	John Wiley & Sons	Publish year	2006

Notes for reference

Goals to be achieved

Be able to derive kinematics of robotic manipulators.

Be able to derive kinematics of robotic manipulators.

Evaluation of achievement

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

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

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

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

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Contact the lecturer by e-mail first.

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

(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～
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～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering					

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

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1A[Seminar on Electrical and Electronic Information Engineering 1A]				
Schedule number	M42610050	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, 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 seminar aims to provide a broad understanding of theoretical and experimental approoches related to the electrical and electronic information engineering for the research work of his/her master thesis.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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

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

Subject name[English]	Methodology of R & D 1[Methodology of R & D 1]				
Schedule number	M42630100	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, 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

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

Subject name[English]	Material Science for Electronics 2[Material Science for Electronics 2]				
Schedule number	M42630130	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	福田　光男, 中村　雄一, 武藤　浩行, 未定 FUKUDA Mitsuo, NAKAMURA Yuichi, MUTO Hiroyuki, To be assigned				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Lecture materials will be distributed.

Lecture materials will be distributed.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Please make an appointment via e-mail.
Please make an appointment via e-mail.

Relations to attainment objectives of learning and education

Key words

photonics, thermelectronics, and powder processing.
photonics, thermelectronics, and powder processing.

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

Subject name[English]	Electrical Energy Systems 2[Electrical Energy Systems 2]				
Schedule number	M42630170	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	滝川 浩史, 櫻井 庸司, 穂積 直裕 TAKIKAWA Hirofumi, SAKURAI Yoji, HOZUMI Naohiro				
Numbering					

Objectives of class

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

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

Contents of class

Sub Course 1
1. Phenomena of ionized gas
2. Characteristics of discharge plasma
3. Recent trend in plasma applications

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

Sub Course 3
1. Energy propagation thorough distributed medium.
2. Diagnosing techniques for industrial and biomedical matters.
3. Assessment for high voltage insulation system for power use.

Sub Course 1
1. Phenomena of ionized gas
2. Characteristics of discharge plasma
3. Recent trend in plasma applications

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

Sub Course 3
1. Energy propagation thorough distributed medium.
2. Diagnosing techniques for industrial and biomedical matters.
3. Assessment for high voltage insulation system for power use.

Self Preparation and Review

Related subjects

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

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

Notes for textbook

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Office: C-311, TEL: 0532-44-6727, E-mail: takikawa@ee.tut.jp
Office: C-311, TEL: 0532-44-6727, E-mail: takikawa@ee.tut.jp

Reference URL

Office hours

Before and/or after the lecture and at any time after making the appointment based on e-mail.
Before and/or after the lecture and at any time after making the appointment based on e-mail.

Relations to attainment objectives of learning and education

Key words

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

(M42630210)Semiconductor Physics 2[Semiconductor Physics 2]

Subject name[English]	Semiconductor Physics 2[Semiconductor Physics 2]				
Schedule number	M42630210	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	若原 昭浩, 岡田 浩, 河野 剛士 WAKAHARA Akihiro, OKADA Hiroshi, KAWANO Takeshi				
Numbering					

Objectives of class

To understand semiconductor physics, structure, design, and processing of advanced semiconductor devices.
To understand semiconductor physics, structure, design, and processing of advanced semiconductor devices.

Contents of class

This subject consists of two parts. The first half begins by introducing majority- and minority-carrier behavior in fundamental pn-junction and MOS structures. Injected minority carrier dynamics in semiconductors is also included. On the latter half, student choose one from following two topics.

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

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

This subject consists of two parts. The first half begins by introducing majority- and minority-carrier behavior in fundamental pn-junction and MOS structures. Injected minority carrier dynamics in semiconductors is also included. On the latter half, student choose one from following two topics.

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3. Advanced MEMS/NEMS technologies(Prof. Kawano)

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Related references, data, printed matters will be given in the class.
S.M.Sze, Physics of Semiconductor Devices (Wiley)

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

Notes for reference

Goals to be achieved

You will be able to:
1. Deeply understand fundamental phenomena in semiconductors, and explain operation principle of basic semiconductor devices to master course students.
2. Design a essential part of semiconductor devcie that satisfies the given specification.
3. Investigate on given topics, and give a lecture on this.

You will be able to:
1. Deeply understand fundamental phenomena in semiconductors, and explain operation principle of basic semiconductor devices to master course students.
2. Design a essential part of semiconductor devcie that satisfies the given specification.
3. Investigate on given topics, and give a lecture on this.

Evaluation of achievement

Achievenemt of lectures of the case study, and writing research reports.

Achievenemt of lectures of the case study, and writing research reports.

Examination

レポートで実施
By Report

Details of examination

Other information

Before choosing a sub-course, contact to following professors

Akihiro Wakahara：C-608　wakahara[at]ee.tut.ac.jp
Hiroshi Okada：C-303B　okada[at]ee.tut.ac.jp
Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp

Before choosing a sub-course, contact to following professors

Akihiro Wakahara：C-608　wakahara[at]ee.tut.ac.jp
Hiroshi Okada：C-303B　okada[at]ee.tut.ac.jp
Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp

Reference URL

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

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advanced Electronic Information System 2[Advanced Electronic Information System 2]				
Schedule number	M42630270	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	市川 周一, 田村 昌也 ICHIKAWA Shuichi, TAMURA Masaya				
Numbering					

Objectives of class

The aims of this lecture:
(1) To understand various topics on logic design and computer aided design (CAD),
(2) To understand the role and design of microwave filter used in wireless communications.

The aims of this lecture:
(1) To understand various topics on logic design and computer aided design (CAD),
(2) To understand the role and design of microwave filter used in wireless communications.

Contents of class

This lecture consists of two themes shown below.

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

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

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

1. Slope Parameter and Q factor
2. Coupling coefficient
3. Stepped Impedance resonator
4. Hybrid resonator
5. Design of unbalanced-unbalanced filter
6. Design of unbalanced-balanced filter (1)
7. Design of unbalanced-balanced filter (2)
8. Examination

This lecture consists of two themes shown below.

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

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

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

1. Slope Parameter and Q factor
2. Coupling coefficient
3. Stepped Impedance resonator
4. Hybrid resonator
5. Design of unbalanced-unbalanced filter
6. Design of unbalanced-balanced filter (1)
7. Design of unbalanced-balanced filter (2)
8. Examination

Self Preparation and Review

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

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

Notes for reference

Goals to be achieved
(1) To understand various CAD tools and the algorithms for CAD,
(2) To understand the role and design of microwave filter used in wireless communications.
(1) To understand various CAD tools and the algorithms for CAD,
(2) To understand the role and design of microwave filter used in wireless communications.

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

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

Details of examination
TBD
TBD

Other information
(1) Shuichi Ichikawa, Room C-404, ext. 6897, E-mail: ichikawa@tut.jp
(2) Masaya Tamura, Room C-405, ext. 6754, E-mail: tamura@ee.tut.ac.jp

(1) Shuichi Ichikawa, Room C-404, ext. 6897, E-mail: ichikawa@tut.jp
(2) Masaya Tamura, Room C-405, ext. 6754, E-mail: tamura@ee.tut.ac.jp

Reference URL
http://www.ccs.ee.tut.ac.jp/~ichikawa/lecture/

http://www.comm.ee.tut.ac.jp/em/index_en.html
http://www.ccs.ee.tut.ac.jp/~ichikawa/lecture/
http://www.comm.ee.tut.ac.jp/em/index_en.html

Office hours

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

Relations to attainment objectives of learning and education

Key words

(1) Logic design, algorithm (2) Analog filter, microwave filter, high-frequency circuit design, distributed constant circuit, Electromagnetic Engineering
(1) Logic design, algorithm (2) Analog filter, microwave filter, high-frequency circuit design, distributed constant circuit, Electromagnetic Engineering

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

Subject name[English]	Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]				
Schedule number	M43610010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, 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 study basic materials in depth, related to his/her research subjects in computer science and engineering.
It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

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

Self Preparation and Review

Consult with your advisor.

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

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

Subject name[English]	Seminar on Computer Science and Engineering II[Seminar on Computer Science and Engineering II]				
Schedule number	M43610020	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	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 study basic materials in depth, related to his/her research subjects in computer science and engineering.
It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

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

Self Preparation and Review

Consult with your advisor.

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

(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

(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～
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

Consult with your advisor for them.

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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～
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員, 3系各教員 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

Consult with your advisor for them.

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

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

Subject name[English]	Seminar on Computer Science and Engineering[Seminar on Computer Science and Engineering]				
Schedule number	M43610040	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	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 study basic materials in depth, related to his/her research subjects in computer science and engineering.
It is also aimed for students to acquire various skills, required in general research work, such as those for oral presentation, and technical discussion and writing.

Contents of class

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

Self Preparation and Review

Consult with your advisor.

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

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

Subject name[English]	Image Processing, Advanced[Image Processing, Advanced]				
Schedule number	M43630100	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	金澤 靖, 菅谷 保之 KANAZAWA Yasushi, SUGAYA Yasuyuki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Geometry, Linear Algebra, Statistics.

Geometry, Linear Algebra, Statistics.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

Reference1	**Book title**	Multiple View Geometry in Computer Vision			**ISBN**	
	Author	R.I. Hartley and A. Zisserman	**Publisher**	Cambridge University Press	**Publish year**	2000
Reference2	**Book title**	Computer Vision -- A Modern Approach --			**ISBN**	
	Author	D.A. Forsyth and J. Ponce	**Publisher**	Prentice Hall	**Publish year**	2003

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

レポートで実施
By Report

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words
image processing, computer vision
image processing, computer vision

(M43630150)Computer Systems, Advanced[Computer Systems, Advanced]

Subject name[English]	Computer Systems, Advanced[Computer Systems, Advanced]				
Schedule number	M43630150	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	小林　良太郎 KOBAYASHI Ryotaro				
Numbering					

Objectives of class

This lecture introduces some important topics on designing computer systems.
This lecture introduces some important topics on designing computer systems.

Contents of class

1) Introduction to computer architecture
2) Instruction set architecture
3) Behavior of control instruction
4) Behavior of memory instruction
5) Continuous instruction processing in single cycle processor
6) Pipeline processor
7) Data hazard in pipeline
6) Behavior of dependent arithmetic instructions in pipeline
7) Behavior of dependent memory instructions in pipeline
8) Memory hierarchy
9) Direct map cache
10) Cache update operation
11) Set associative cache
12) Control hazard in pipeline
13) Branch direction prediction
14) Branch target prediction
15) Speculative execution based on branch prediction
16) Examination
1) Introduction to computer architecture
2) Instruction set architecture
3) Behavior of control instruction
4) Behavior of memory instruction
5) Continuous instruction processing in single cycle processor
6) Pipeline processor
7) Data hazard in pipeline
6) Behavior of dependent arithmetic instructions in pipeline
7) Behavior of dependent memory instructions in pipeline
8) Memory hierarchy
9) Direct map cache
10) Cache update operation
11) Set associative cache
12) Control hazard in pipeline
13) Branch direction prediction
14) Branch target prediction
15) Speculative execution based on branch prediction
16) Examination

Self Preparation and Review

Preparation and review based on the given course materials is helpful for understanding the above-mentioned items.
Although there is no use to buy the following reference book in this class, a tiny part of it may be helpful.
* Computer Architecture A Quantitative Approach, John L. Hennessy David A. Patterson (ISBN-13: 978-9381269220)
Preparation and review based on the given course materials is helpful for understanding the above-mentioned items.
Although there is no use to buy the following reference book in this class, a tiny part of it may be helpful.

* Computer Architecture A Quantitative Approach, John L. Hennessy David A. Patterson (ISBN-13: 978-9381269220)

Related subjects

Notes for textbook

Course materials and references will be given by the lecturer.
Course materials and references will be given by the lecturer.

Notes for reference

Goals to be achieved

Students are required to obtain the knowledge on the above-mentioned items.
Students are required to obtain the knowledge on the above-mentioned items.

Evaluation of achievement

Attendance to all classes is compulsory. Absence without reasonable excuses (for example, oversleeping and lapse of memory) is unacceptable.

There will be a term-end examination. The evaluation is performed based on the followings:
A: score is more than 80 points
B: score is more than 65 points
C: score is more than 55 points

Attendance to all classes is compulsory. Absence without reasonable excuses (for example, oversleeping and lapse of memory) is unacceptable.

There will be a term-end examination. The evaluation is performed based on the followings:
A: score is more than 80 points
B: score is more than 65 points
C: score is more than 55 points

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Reference URL

Office hours

Students are to make an appointment via e-mail if they want to see the lecturer.
Students are to make an appointment via e-mail if they want to see the lecturer.

Relations to attainment objectives of learning and education

Key words

Computer architecture, Pipelining, Cache, Branch prediction
Computer architecture, Pipelining, Cache, Branch prediction

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

Subject name[English]	Networking, Advanced 1[Networking, Advanced 1]				
Schedule number	M43630240	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	梅村 恭司 UMEMURA Kyoji				
Numbering					

Objectives of class

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

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

Contents of class

1. Link Layer
2. Internet Protocol
3. Address Resolution Protocol
4. Internet Control Message Protocol
5. IP routing and Dynamic Routing Protocol
6. Transmission Control Protocol
7. TCP interactive and bulk data flow

1. Link Layer
2. Internet Protocol
3. Address Resolution Protocol
4. Internet Control Message Protocol
5. IP routing and Dynamic Routing Protocol
6. Transmission Control Protocol
7. TCP interactive and bulk data flow

Self Preparation and Review

Related subjects

The ability to write simple client/server programs are required.

The ability to write simple client/server programs are required.

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

The goal is to understand the way that computer network works precisely.

The goal is to understand the way that computer network works precisely.

Evaluation of achievement

Examination will be held in the last class.

Examination will be held in the last class.

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

C－304 umemura@tut.jp

C－304 umemura@tut.jp

Reference URL

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

Computer Network, Distributed Systems

Computer Network, Distributed Systems

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

Subject name[English]	Networking, Advanced 2[Networking, Advanced 2]				
Schedule number	M43630250	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Wed.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	大村　廉 OMURA Ren				
Numbering					

Objectives of class

The aim of this class is to understand the concepts, system architecture, and algorithm in distributed computing. The class will cover both of theoretical discussion and practical applications.
The contents will focus on advanced topics in distributed systems, namely the knowledge of computer network and basics of distributed systems are required beforehand.

The aim of this class is to understand the concepts, system architecture, and algorithm in distributed computing. The class will cover both of theoretical discussion and practical applications.
The contents will focus on advanced topics in distributed systems, namely the knowledge of computer network and basics of distributed systems are required beforehand.

Contents of class

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

Self Preparation and Review

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

Related subjects

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

Textbook1	**Book title**	Distributed Systems: Principles and Paradigms (2nd Edition)			**ISBN**	978-0132392273
	Author	Andrew S. Tanenbaum, and Maarten Van Steen	**Publisher**	Prentice Hall	**Publish year**	2006

Notes for textbook

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

Notes for reference

Related materials, such as books, videos, and web pages, are introduced in the class.
Related materials, such as books, videos, and web pages, are introduced in the class.

Goals to be achieved

The aim of this class is to understand;
(1) the basic methods and concepts of synchronization in distributed systems;
(2) the concepts and variations of consistency in distributed systems;
(3) the basic concepts and methods of fault tolerance in distributed systems;
(4) the basic concepts of security in distributed systems;
(5) and some practical examples of distributed systems.

The aim of this class is to understand;
(1) the basic methods and concepts of synchronization in distributed systems;
(2) the concepts and variations of consistency in distributed systems;
(3) the basic concepts and methods of fault tolerance in distributed systems;
(4) the basic concepts of security in distributed systems;
(5) and some practical examples of distributed systems.

Evaluation of achievement

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

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

Examination

その他
Other

Details of examination

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

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

Other information

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

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

Reference URL

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

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

Office hours

You can ask any questions anytime by e-mail. If you come to the teacher's office, you need to have an appointment.

You can ask any questions anytime by e-mail. If you come to the teacher's office, you need to have an appointment.

Relations to attainment objectives of learning and education

Key words

Distributed System, Computer Network, Operating System

Distributed System, Computer Network, Operating System

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

Subject name[English]	Advanced Robotics and Informatics 1[Advanced Robotics and Informatics 1]				
Schedule number	M43630260	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	三浦 純 MIURA Jun				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Fundamental knowledge of linear algebra and probability theory are useful.

Fundamental knowledge of linear algebra and probability theory are useful.

Notes for textbook

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

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

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

Notes for reference

Goals to be achieved

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Evaluation of achievement

Grade will be determined by the report.

Grade will be determined by the report.

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

ID and password will be given at the class.

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

ID and password will be given at the class.

Office hours

Make an appointment beforehand by email.

Make an appointment beforehand by email.

Relations to attainment objectives of learning and education

Key words

Robotics

Robotics

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

Subject name[English]	Advanced Robotics and Informatics 2[Advanced Robotics and Informatics 2]				
Schedule number	M43630270	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	岡田 美智男 OKADA Michio				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Fundamentals of cognitive science.

Fundamentals of cognitive science.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

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

Notes for reference

Goals to be achieved

Understanding of the fundamentals of social robotics including:

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

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

Evaluation of achievement

Grade will be determined by the presentation and final report.

Grade will be determined by the presentation and final report.

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

Tuesday, 14:30-16:00

Tuesday, 14:30-16:00

Relations to attainment objectives of learning and education

Key words

Social Robotics, Cognitive Robotics, Social Interaction

Social Robotics, Cognitive Robotics, Social Interaction

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

Subject name[English]	Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics 1]				
Schedule number	M43630300	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	村越 一支 MURAKOSHI Kazushi				
Numbering					

Objectives of class

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

Contents of class

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

1st week: A
2nd week: B
3rd week: C
4th week: D
5th week: E F
6th week: G
7th week: H I
A. Introduction
What is complex and intelligent systems? Outline of the brain system.
B. Computational Neuroscience and Application-oriented Mathematical Models
What is computational Neuroscience and artificial neural networks?
C. Model Neurons
Structure of neurons, synapse, model neurons.
D. Learning at connected part of neurons (synapse)
Synaptic plasticity, spike-timing-dependent plasticity (STDP).
E. Simulation Methods
Numerical calculation methods for single neuron, neural network from single neuron.
F. Simulation Environments
Explanation and demonstration of simulation environments such as NEURON and GENESIS.
G. Self-organizing

What is self-organizing? Winner Takes All, Self-organizing map (SOM)
H. Reinforcement Learning
What is reinforcement learning, reinforcement learning in the brain, demonstration of reinforcement learning for controlling robot
I. Summary

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

Self Preparation and Review

Related subjects

Notes for textbook
Handouts are distributed.

Handouts are distributed.

Notes for reference

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

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

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

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

Details of examination

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

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

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

Office hours
After this class
After this class

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Complex Systems and Intelligent Informatics 2[Complex Systems and Intelligent Informatics 2]				
Schedule number	M43630310	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	石田　好輝 ISHIDA Yoshiteru				
Numbering					

Objectives of class

This course provides opportunities to learn the followings:
* Modeling and analysis on complex systems and learning systems,
* System theoretic analysis on complex systems and learning systems ,
* Computer simulations and implications, and
* Implementation of complex systems and learning systems.
Recent topics on complex systems and learning systems will be also discussed in the course.

This course provides opportunities to learn the followings:
* Modeling and analysis on complex systems and learning systems,
* System theoretic analysis on complex systems and learning systems ,
* Computer simulations and implications, and
* Implementation of complex systems and learning systems.
Recent topics on complex systems and learning systems will be also discussed in the course.

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

No textbook. References other than below will be suggested at the first class.

Ishida, Y.: Immunity-Based Systems, Springer (2004);
Barabasi, A.L.: Linked, Perseus, (2002)
Strogatz, S. H. Sync, Hyperion (2003)

Notes for reference

Goals to be achieved

Evaluation of achievement
Class performance (50%) and term-end report (50%)
Class performance (50%) and term-end report (50%)

Examination
レポートで実施
By Report

Details of examination

Other information
Room F-504, Ext. 6895
Room F-504, Ext. 6895

Reference URL

Office hours
Wednesday 16:30-17:00
Wednesday 16:30-17:00

Relations to attainment objectives of learning and education

情報・知能工学専攻
(C)理論的・応用的知識の獲得と発展的活用能力
重要な学術・技術分野の理論・応用知識を自発的に獲得し，発展的に活用できる能力
(D)広範囲の知識を有機的に連携させた研究開発方法論の体得
広範囲の知識の連携による研究開発に対する方法論を体得し，研究開発の計画立案と，それを実践できる能力
(E)国内外において活躍できる表現力・コミュニケーション力
論文，口頭及び情報メディアを通じて，自分の論点や考えなどを国の内外において効果的に表現し，コミュニケーションする能力とプレゼンテーションする能力
(F)最新の技術や社会環境の変化に対する探究心と持続的学習力
社会，環境，技術等の変化に対応して，生涯にわたって自発的に学習する能力

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

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

Subject name[English]	Seminar on Environmental and Life Science I[Seminar on Environmental and Life Science I]				
Schedule number	M44610010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, 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

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Supervisor(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Seminar on Environmental and Life Science II[Seminar on Environmental and Life Science II]				
Schedule number	M44610020	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Environmental and Life Sciences			**Beggining grade**	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

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Supervisor(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Thesis Research on Environmental and Life Science[Thesis Research on Environmental and Life Science]				
Schedule number	M44610030	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	2Years	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	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

(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～
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～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 4系各教員 4kei kyomu Iin-S, 4kei kakukyouin				
Numbering					

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(s)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

Subject name[English]	Seminar on Environmental and Life Science[Seminar on Environmental and Life Science]				
Schedule number	M44610040	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Environmental and Life Sciences			**Beggining grade**	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

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

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

Subject name[English]	Advanced Separation Chemistry I[Advanced Separation Chemistry I]				
Schedule number	M44630010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	齊戸　美弘 SAITO Yoshihiro				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Separation Chemistry II.

Advanced Separation Chemistry II.

Notes for textbook

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

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

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Separation Chemistry II[Advanced Separation Chemistry II]				
Schedule number	M44630020	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	平田　幸夫 HIRATA Yukio				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook

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

Textbook

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

Reference1	**Book title**	Chromatography: Concepts and Contrasts			**ISBN**	
	Author	J. M. Miller	**Publisher**	John Wiley & Sons	**Publish year**	

Notes for reference

Goals to be achieved

To undersatnd the principle of chromatography.

To undersatnd the principle of chromatography.

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

As needed.

As needed.

Relations to attainment objectives of learning and education

Key words

(M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	Advanced Polymer Chemistry[Advanced Polymer Chemistry]				
Schedule number	M44630070	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	伊津野 真一, 原口 直樹 ITSUNO Shinichi, HARAGUCHI Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Organic Chemistry
Polymer chemistry
Organic Chemistry
Polymer chemistry

Notes for textbook

No textbook will be used.
No textbook will be used.

Notes for reference

Goals to be achieved

1)To understand radical polymerization of vinyl monomers

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

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

レポートで実施
By Report

Details of examination

Other information

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

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6812
haraguchi@ens.tut.ac.jp

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6813
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Reference URL

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

Office hours

Any time
Any time

Relations to attainment objectives of learning and education

Key words

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

(M44630080)Advanced Polymer Engineering[Advanced Polymer Engineering]

Subject name[English]	Advanced Polymer Engineering[Advanced Polymer Engineering]				
Schedule number	M44630080	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	吉田　絵里 YOSHIDA Eri				
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
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

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

Subject name[English]	Advanced Molecular Life Science[Advanced Molecular Life Science]				
Schedule number	M44630120	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	田中 照通, 梅影 創 TANAKA Terumichi, UMEKAGE So				
Numbering					

Objectives of class

This course will provide students with the opportunity to read recent important research papers on RNA engineering. Therefore, the knowledge of basic biotechnology, biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are NOT qualified for this course. The students will be required to read, summarize and present two or more research papers. The number of research papers should be presented will be decided by number of students.

This course will provide students with the opportunity to read recent important research papers on RNA engineering. Therefore, the knowledge of basic biotechnology, biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are NOT qualified for this course. The students will be required to read, summarize and present two or more research papers. The number of research papers should be presented will be decided by number of students.

Contents of class

This Class goes with the "Original Papers" of the recent RNA engineering published in the Nucleic Acids Research. At first, students must access the HP of Nucleic Acids Research: http://nar.oxfordjournals.org/.
Next, pick two or more good research papers published after 2014 in the Nucleic Acids Research.
After that, every student will give a presentation of the chosen paper. Students will be given 20 min for the presentation. In that duration, the student must explain plainly, but throughout the novelty of the research.

This Class goes with the "Original Papers" of the recent RNA engineering published in the Nucleic Acids Research. At first, students must access the HP of Nucleic Acids Research: http://nar.oxfordjournals.org/.
Next, pick two or more good research papers published after 2014 in the Nucleic Acids Research.
After that, every student will give a presentation of the chosen paper. Students will be given 20 min for the presentation. In that duration, the student must explain plainly, but throughout the novelty of the research.

Self Preparation and Review

Related subjects

Biotechnology, molecular biology

Biotechnology, molecular biology

Notes for textbook

Notes for reference

Goals to be achieved

To understand cutting-edge biotechnology based on RNA engineering.

To understand cutting-edge biotechnology based on RNA engineering.

Evaluation of achievement

Presentation (100%)

Presentation (100%)

Examination

その他

Other

Details of examination

Other information

So Umekage: ex.5832, umekage@ens.tut.ac.jp, G1-201

So Umekage: ex.5832, umekage@ens.tut.ac.jp, G1-201

Reference URL

Office hours

Please make an appointment.

Please make an appointment.

Relations to attainment objectives of learning and education

Key words

RNA, biotechnology, molecular biology

RNA, biotechnology, molecular biology

(M44630130)Advanced Applied Biochemistry and Biotechnology[Advanced Applied Biochemistry and Biotechnology]

Subject name[English]	Advanced Applied Biochemistry and Biotechnology[Advanced Applied Biochemistry and Biotechnology]				
Schedule number	M44630130	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	平石 明, 浴 俊彦 HIRAISHI Akira, EKI Toshihiko				
Numbering					

Objectives of class

1. Applied Microbiology and Biochemistry: Fundamentals of microbiology and bioenergetics and their applications to fermentation technology and environmental biotechnology
2. Molecular Biology and Genomics: Principle and current progress in genome sciences will be discussed.

1. Applied Microbiology and Biochemistry: Fundamentals of microbiology and bioenergetics and their applications to fermentation technology and environmental biotechnology
2. Molecular Biology and Genomics: Principle and current progress in genome sciences will be discussed.

Contents of class

1. Applied Microbiology and Biochemistry
1) Introduction of microbiology – Biodiversity, taxonomy and physiology of microorganisms
2) Fundamentals of bioenergetics
3) Modes of microbial energy-yielding systems
4) Industrial microbiology and environmental biotechnology
2. Molecular Biology and Genomics
1) Introduction of genome research
2) Mapping and Sequencing technology
3) Functional genomics

1. Applied Microbiology and Biochemistry
1) Introduction of microbiology – Biodiversity, taxonomy and physiology of microorganisms
2) Fundamentals of bioenergetics
3) Modes of microbial energy-yielding systems
4) Industrial microbiology and environmental biotechnology
2. Molecular Biology and Genomics
1) Introduction of genome research
2) Mapping and Sequencing technology
3) Functional genomics

Self Preparation and Review

Related subjects

The knowledge of basic microbiology, biochemistry and molecular biology is absolutely required.

The knowledge of basic microbiology, biochemistry and molecular biology is absolutely required.

Notes for textbook

For Applied Microbiology and Biochemistry:
M. T. Madigan et al."Brock Biology of Microorganisms" Prentice Hall
For Molecular Biology and Genomics
S. B. Primrose and R. M. Twyman "Principles of Genome Analysis and Genomics" 3rd Ed. Blackwell Science

For Applied Microbiology and Biochemistry:
M. T. Madigan et al."Brock Biology of Microorganisms" Prentice Hall
For Molecular Biology and Genomics
S. B. Primrose and R. M. Twyman "Principles of Genome Analysis and Genomics" 3rd Ed. Blackwell Science

Notes for reference

Goals to be achieved

The aims of the lesson are to get basic knowledge of applied microbiology, genomics and molecular biology and to understand

the current technology in the field of these researches.
The aims of the lesson are to get basic knowledge of applied microbiology, genomics and molecular biology and to understand the current technology in the field of these researches.

Evaluation of achievement

Grades for the course will be based on the average of the subjects score (Hiraishi and Eki).
Interim report (30%) and term-end report (70%) for Applied Microbiology and Biochemistry (Hiraishi).
Presentation (30%) and term-end report (70%) for Molecular Biology and Genomics (Eki).
Grades for the course will be based on the average of the subjects score (Hiraishi and Eki).
Interim report (30%) and term-end report (70%) for Applied Microbiology and Biochemistry (Hiraishi).
Presentation (30%) and term-end report (70%) for Molecular Biology and Genomics (Eki).

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Prof. Akira Hiraishi (G503) Tel: 6913, e-mail: hiraishi@ens.tut.ac.jp
Prof. Toshihiko Eki (G505) Tel: 6907, e-mail: eki@ens.tut.ac.jp
Prof. Akira Hiraishi (G503) Tel: 6913, e-mail: hiraishi@ens.tut.ac.jp
Prof. Toshihiko Eki (G505) Tel: 6907, e-mail: eki@ens.tut.ac.jp

Reference URL

Office hours

Please make an appointment.
Please make an appointment.

Relations to attainment objectives of learning and education

Key words

microbiology, applied biochemistry, molecular biology, genomics
microbiology, applied biochemistry, molecular biology, genomics

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

Subject name[English]	Advanced Life Science and Biotechnology I[Advanced Life Science and Biotechnology I]				
Schedule number	M44630210	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, 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 selected subjects in the realm of advanced life science and biotechnology.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Life Science and Biotechnology II

Advanced Life Science and Biotechnology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on life science and biotechnology

To be able to report and discuss the contents of textbooks and papers he/she has read.

To acquire advanced knowledge on life science and biotechnology

To be able to report and discuss the contents of textbooks and papers he/she has read.

Evaluation of achievement

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

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

Examination

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

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

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

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

Subject name[English]	Advanced Environmental Technology I[Advanced Environmental Technology I]				
Schedule number	M44630230	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, 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 advanced environmental science and technology.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Environmental Technology II

Advanced Environmental Technology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on environmental science and technology

To be able to report and discuss the contents of textbooks and papers he/she has read.

To acquire advanced knowledge on environmental science and technology

To be able to report and discuss the contents of textbooks and papers he/she has read.

Evaluation of achievement

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

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

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

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

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

Subject name[English]	Advanced Environmental and Ecological Systems I[Advanced Environmental and Ecological Systems I]				
Schedule number	M44630250	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, 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 advanced environmental and ecological systems.

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on environmental science and technology and ecological systems

To be able to report and discuss the contents of textbook and papers he/she has read.

To acquire advanced knowledge on environmental science and technology and ecological systems

To be able to report and discuss the contents of textbook and papers he/she has read.

Evaluation of achievement

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

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

Examination

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

(M44630270)Special Topics in Inorganic Chemistry[Special Topics in Inorganic Chemistry]

Subject name[English]	Special Topics in Inorganic Chemistry[Special Topics in Inorganic Chemistry]				
Schedule number	M44630270	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	角田 範義 KAKUTA Noriyoshi				
Numbering					

Objectives of class

The present class is intended to provide this extended readership with a concise overview of the applications of inorganic chemistry in a world that is increasingly dominated by technology and its ramifications, beneficial or otherwise.

The present class is intended to provide this extended readership with a concise overview of the applications of inorganic chemistry in a world that is increasingly dominated by technology and its ramifications, beneficial or otherwise.

Contents of class

based on the textbook of "Inorganic Chemistry: An industrial and Environmental Perspective" by T.W.Swaddle.

1.Chemical Energetics
.Kinetics and Thermodynamics
.Activities of Electrolyte Solutions
.Equilibrium and Energy
.Temperature and Pressure Effects on Equilibrium
.Chemical Kinetics
.Ionization Potential and Electron Affinity
.Electronegativity and Bond Energies
.Electronegativity and Chemical Properties
.Hard and Soft Acids and Bases
.Multiple Bonding and Its Chemical Consequences
.Explosives and Propellants

2.Inorganic Solids as a Heterogeneous Catalysts
5 terms
3.Silicates, Aluminates, and Phosphates
7 termes
4.The Atomosphere and Atmospheric Pollution
5 terms
5.Nitrogen, Phosphorus, and Potash in Agriculture
7 terms
6.Sulfur and Sulfur Compounds
4 terms

based on the textbook of "Inorganic Chemistry: An industrial and Environmental Perspective" by T.W.Swaddle.

1.Chemical Energetics
.Kinetics and Thermodynamics
.Activities of Electrolyte Solutions
.Equilibrium and Energy
.Temperature and Pressure Effects on Equilibrium
.Chemical Kinetics
.Ionization Potential and Electron Affinity
.Electronegativity and Bond Energies
.Electronegativity and Chemical Properties

.Hard and Soft Acids and Bases
.Multiple Bonding and Its Chemical Consequences
.Explosives and Propellants

2.Inorganic Solids as a Heterogeneous Catalysts
5 terms
3.Silicates, Aluminates, and Phosphates
7 termes
4.The Atomosphere and Atmospheric Pollution
5 terms
5.Nitrogen, Phosphorus, and Potash in Agriculture
7 terms
6.Sulfur and Sulfur Compounds
4 terms

Self Preparation and Review

Related subjects
Basic knowledges of physical chemistry and inorganic chemistry are required.
Basic knowledges of physical chemistry and inorganic chemistry are required.

Textbook1	**Book title**	Inorganic Chemstry			**ISBN**	0-12-678550-3
	Author	T.W.Swaddle	**Publisher**	Academic Press	**Publish year**	1997

Notes for textbook

Notes for reference

Goals to be achieved
To understand basics of "application of inorganic chemistry"
To understand basics of "application of inorganic chemistry"

Evaluation of achievement
30% Homework report, 70% pre-examination or report
30% Homework report, 70% pre-examination 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
Room # B-302, E-mail: kakuta@ens.tut.ac.jp,
Room # B-302, E-mail: kakuta@ens.tut.ac.jp,

Reference URL

Office hours
Anytime when I will be.
Anytime when I will be.

Relations to attainment objectives of learning and education

Key words
Chemical enegetics, Heterogeneous catalysts, silicate, Aluminate, Phosphates, pollution, Nitrogen, Sulfur
Chemical enegetics, Heterogeneous catalysts, silicate, Aluminate, Phosphates, pollution, Nitrogen, Sulfur

(M44630300)Applied Environmental Biology[Applied Environmental Biology]

Subject name[English]	Applied Environmental Biology[Applied Environmental Biology]				
Schedule number	M44630300	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	中鉢 淳 NAKABACHI Atsushi				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

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

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

Related subjects

Notes for textbook

No textbooks are required.

No textbooks are required.

Reference1	**Book title**	Molecular Biology of the Cell			**ISBN**	978-0815344643
	Author	Bruce Alberts et al.	**Publisher**	Garland Science	**Publish year**	2014
Reference2	**Book title**	Evolution			**ISBN**	978-0879696849

	Author	Nicholas H. Barton et al.	**Publisher**	Cold Spring Harbor Laboratory Press	**Publish year**	2007
Reference3	**Book title**	Plant Physiology			**ISBN**	978-0878935659
	Author	Lincoln Taiz, Eduardo Zeiger	**Publisher**	Sinauer Associates Inc.	**Publish year**	2010

Notes for reference

Goals to be achieved

(1) Understand the concept of evolution and biodiversity.
(2) Can explain how genomes are analyzed.
(3) Can tell the difference between prokaryotic and eukaryotic genomes.
(4) Know various biological interactions.
(5) Know important agricultural pests and diseases.
(6) Understand the concept of integrated pest management.
(7) Understand the technology for developing genetically modified crops.

(1) Understand the concept of evolution and biodiversity.
(2) Can explain how genomes are analyzed.
(3) Can tell the difference between prokaryotic and eukaryotic genomes.
(4) Know various biological interactions.
(5) Know important agricultural pests and diseases.
(6) Understand the concept of integrated pest management.
(7) Understand the technology for developing genetically modified crops.

Evaluation of achievement

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

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Emails are welcome.
Emails are welcome.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]				
Schedule number	M45610010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, 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

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

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Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering II[Seminar on Architecture and Civil Engineering II]				
Schedule number	M45610020	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	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

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

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その他

By Report

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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, 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

(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～
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

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

Contents of class

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

Self Preparation and Review

Related subjects

TBD by the laboratory

Notes for textbook

TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

その他

By Report

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

(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～
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).

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

その他

By Report

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]				
Schedule number	M45610040	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	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

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

(M45630010)Elasticity and Stability[Elasticity and Stability]

Subject name[English]	Elasticity and Stability[Elasticity and Stability]				
Schedule number	M45630010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	松本　幸大 MATSUMOTO Yukihiro				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Based on reports
Based on reports

Examination
レポートで実施
By Report

Details of examination

Other information

Reference URL
http://www.st.ace.tut.ac.jp/
http://sel.ace.tut.ac.jp/y-matsum/
http://www.st.ace.tut.ac.jp/
http://sel.ace.tut.ac.jp/y-matsum/

Office hours
Please contact by email.
Please contact by email.

Relations to attainment objectives of learning and education

Key words

(M45630090)Coastal Hydraulics[Coastal Hydraulics]

Subject name[English]	Coastal Hydraulics[Coastal Hydraulics]				
Schedule number	M45630090	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	加藤 茂 KATO Shigeru				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

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

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

Related subjects

Basic knowledge of coastal engineering is desirable.

Basic knowledge of coastal engineering is desirable.

Notes for textbook

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

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

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

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

Notes for reference

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

Evaluation of achievement
Reports & attendance
Reports & attendance

Examination
レポートで実施
By Report

Details of examination

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

Reference URL
N/A
N/A

Office hours
At any time.
But please ask me the visit time in advance.
At any time.
But please ask me the visit time in advance.

Relations to attainment objectives of learning and education
N/A

N/A

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

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

Subject name[English]	Advanced Structural System Planning and Design I[Advanced Structural System Planning and Design I]				
Schedule number	M45630190	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, 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.

Contents of class

Self Preparation and Review

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Goals to be achieved

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Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Environmental System Planning and Design I[Advanced Environmental System Planning and Design I]				
Schedule number	M45630210	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, 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.

Contents of class

Self Preparation and Review

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Evaluation of achievement

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Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Regional System Planning and Design I[Advanced Regional System Planning and Design I]				
Schedule number	M45630230	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, 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.

Contents of class

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Evaluation of achievement

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Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seismic Design of Structures[Seismic Design of Structures]				
Schedule number	M45630290	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Wed.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	齊藤　大樹 SAITOH Taiki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

None

None

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Professor Taiki Saito (D805), e-mail: tsaito@ace.tut.ac.jp (Room: D-805)

Professor Taiki Saito (D805), e-mail: tsaito@ace.tut.ac.jp (Room: D-805)

Reference URL

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

Office hours

Please contact by e-mail to make an appointment.
Please contact by e-mail to make an appointment.

Relations to attainment objectives of learning and education

Key words