Syllabus

International Master′s Degree Program

（2011-Fall Term）

(M40030023)Industrial Policies[Industrial Policies]

Subject name[English]	Industrial Policies[Industrial Policies]				
Schedule number	M40030023	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Wed.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	渋澤 博幸 SHIBUSAWA Hiroyuki				
Numbering					

Objectives of class

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Economics, Policy, Simulation
Economics, Policy, Simulation

Notes for textbook

Papers will be distributed.

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

Papers will be distributed.

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

Notes for reference

Goals to be achieved

Advanced Input-Outpu Analysis
Advanced Economic Simulation Methods

Advanced Input-Outpu Analysis
Advanced Economic Simulation Methods

Evaluation of achievement

Test(50%)+Report(50%)=100%
a: 80 Points or higher, B:65 points or higher, C:55 points or higher, D: Less than 55 points
Test(50%)+Report(50%)=100%
a: 80 Points or higher, B:65 points or higher, C:55 points or higher, D: Less than 55 points

Examination

Details of examination

Other information

Room: B-409
Tel:6963
E-mail:shibu@hse.tut.ac.jp
Room: B-409
Tel:6963
E-mail:shibu@hse.tut.ac.jp

Reference URL

Office hours

Tuesday 10:00-12:00
Tuesday 10:00-12:00

Relations to attainment objectives of learning and education

Key words

Industrial Policy, Economics, Simulation
Industrial Policy, Economics, Simulation

(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**	Fri.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	山本　綾 YAMAMOTO Aya				
Numbering					

Objectives of class

The aims of this course include:
- to discuss various topics on language and communication in which culture plays a key role
- to introduce students to the basic steps of research on language, communication and culture

The aims of this course include:
- to discuss various topics on language and communication in which culture plays a key role
- to introduce students to the basic steps of research on language, communication and culture

Contents of class

Week 1 Introduction
Week 2 Chapter 9: Proverbs
Week 3 Chapter 10: Idioms
Week 4 Chapter 11: Textbook Language
Week 5 Chapter 12: Comparing
Week 6 Chapter 13: Politically correct language
Week 7 Chapter 14: Pronunciation
Week 8 Chapter 15: Agreeing, disagreeing, or simply not knowing
Week 9 Chapter 16: Reflections of language and culture
Week 10 Mid-term exam
Week 11 Research Project: Think about possible project ideas
Week 12 Research Project: Develop your topic
Week 13 Research Project: Prepare an outline for your report
Week 14 Research Project: Write your final report
Week 15 Presentation

Week 1 Introduction
Week 2 Chapter 9: Proverbs
Week 3 Chapter 10: Idioms
Week 4 Chapter 11: Textbook Language
Week 5 Chapter 12: Comparing
Week 6 Chapter 13: Politically correct language
Week 7 Chapter 14: Pronunciation
Week 8 Chapter 15: Agreeing, disagreeing, or simply not knowing
Week 9 Chapter 16: Reflections of language and culture
Week 10 Mid-term exam
Week 11 Research Project: Think about possible project ideas
Week 12 Research Project: Develop your topic
Week 13 Research Project: Prepare an outline for your report
Week 14 Research Project: Write your final report
Week 15 Presentation

Self Preparation and Review

Related subjects

British Culture and American Culture I, graduate and undergraduate courses on languages, cultures and societies

British Culture and American Culture I, graduate and undergraduate courses on languages, cultures and societies

Notes for textbook

Stapleton, P. (2006). "How culture affects communication". 金星堂.
ISBN 4-7647-3811-2

Stapleton, P. (2006). "How culture affects communication". 金星堂.
ISBN 4-7647-3811-2

Notes for reference

Goals to be achieved

At the end of this course, the students will have:
- gained deeper understanding of the English and Japanese languages and cultures
- learned how to and been able to describe cultural variations between Japan and English-speaking countries

At the end of this course, the students will have:
- gained deeper understanding of the English and Japanese languages and cultures
- learned how to and been able to describe cultural variations between Japan and English-speaking countries

Evaluation of achievement

Exam (Mid-term) 40 %
Research project (In-class presentation & final paper) 40 %
Class participation & reaction paper 20 %

Final grades will be given on an absolute scale:
80% or above: A
65% or above (below 80%): B
55% or above (below 65%): C
Below 55%: D

Exam (Mid-term) 40 %
Research project (In-class presentation & final paper) 40 %
Class participation & reaction paper 20 %

Final grades will be given on an absolute scale:
80% or above: A
65% or above (below 80%): B
55% or above (below 65%): C
Below 55%: D

Examination

Details of examination

Other information

Office：B-310
Phone (ext)：6957
E-mail: aya_ymmt@las.tut.ac.jp

Office：B-310
Phone (ext)：6957
E-mail: aya_ymmt@las.tut.ac.jp

Reference URL

N/A

N/A

Office hours

Fall semester: Monday 11:00 - 12:30
(also available by appointment)

Fall semester: Monday 11:00 - 12:30
(also available by appointment)

Relations to attainment objectives of learning and education

Key words

English, Japanese, Culture
English, Japanese, Culture

(M40030070)Environmental Planning[Environmental Planning]

Subject name[English]	Environmental Planning[Environmental Planning]				
Schedule number	M40030070	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	平松 登志樹 HIRAMATSU Toshiki				
Numbering					

Objectives of class

The measurement of the benefit of the environmental improvement or environmental protection(or the environmental destruction)is considered. The improvement of the estimation method is tried by measuring the benefit concerning the environment while clarifying the reason why the Hedonic Approach and CVM (Contingent Valuation Method) are strong.

The measurement of the benefit of the environmental improvement or environmental protection(or the environmental destruction)is considered. The improvement of the estimation method is tried by measuring the benefit concerning the environment while clarifying the reason why the Hedonic Approach and CVM (Contingent Valuation Method) are strong.

Contents of class

Environmental Planning

1.Development or Environmental Preservation
2.Cost-Benefit Analysis
3.Benefit Estimation
4.CVM(Contingent Valuation Method) , Hedonic Approach ,Travel Cost Method
5.Reconsideration of Benefit
6.Benefit of Environmental Destruction
7.Conquest Feeling by Omnipotence
8.Bullying and Environmental Destruction or Omnipotence
9.Communication with Nature or Artificial Material
10.Science and Omnipotence
11.Science theory of Karl R.Popper
12.Benefit of Environmental Preservation
13.Dignity of the Existence Thing or Wickedness to Trample Down the Dignity of the Existence Thing
14.Restructuring of Science-Arrangement of Artificial Material
15.Science of Solid Phase or Gas Phase and Liquid Phase

Environmental Planning

1.Development or Environmental Preservation
2.Cost-Benefit Analysis
3.Benefit Estimation
4.CVM(Contingent Valuation Method) , Hedonic Approach ,Travel Cost Method
5.Reconsideration of Benefit
6.Benefit of Environmental Destruction
7.Conquest Feeling by Omnipotence
8.Bullying and Environmental Destruction or Omnipotence
9.Communication with Nature or Artificial Material
10.Science and Omnipotence
11.Science theory of Karl R.Popper
12.Benefit of Environmental Preservation
13.Dignity of the Existence Thing or Wickedness to Trample Down the Dignity of the Existence Thing
14.Restructuring of Science-Arrangement of Artificial Material
15.Science of Solid Phase or Gas Phase and Liquid Phase

Self Preparation and Review

Related subjects

Environment and Planning

Society Designing
Society and Environment
Environment and Planning
Society Designing
Society and Environment

Notes for textbook

Toshiki Hiramatsu(2011),YAKUDOUSURU SYAKAIKOUGAKU,Bungeisya
Toshiki Hiramatsu(2011),YAKUDOUSURU SYAKAIKOUGAKU,Bungeisya

Notes for reference

Goals to be achieved

Understanding of CVM
Understanding of CVM

Evaluation of achievement

Understanding of CVM
A:Excellent B:Good C:Acceptable
Understanding of CVM
A:Excellent B:Good C:Acceptable

Examination

Details of examination

Other information

Toyohashi University of Technology ,Institute of Liberal Arts and Sciences
1-1 Hibarigaoka,Tenpaku-cho,Toyohashi-shi,Aichi,441-8580,JAPAN
PHONE 81-532-44-6952
FAX 81-532-44-6947
E-mail tora@las.tut.ac.jp
http://133.15.161.28/

Toyohashi University of Technology ,Institute of Liberal Arts and Sciences
1-1 Hibarigaoka,Tenpaku-cho,Toyohashi-shi,Aichi,441-8580,JAPAN
PHONE 81-532-44-6952
FAX 81-532-44-6947
E-mail tora@las.tut.ac.jp
http://133.15.161.28/

Reference URL

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heet://133.15.161.28/

Office hours

Thursday 9:55-11:10
Thursday 9:55-11:10

Relations to attainment objectives of learning and education

Key words

benefit,hedonic approach,CVM,bullying,environmental destruction
benefit,hedonic approach,CVM,bullying,environmental destruction

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering					

Objectives of class

Fundamentals of micromachining technologies for the development of "Micro Electro Mechanical System (MEMS)" and "Micro Total Analysis System (μ TAS)".

Fundamentals of micromachining technologies for the development of "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

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

Self Preparation and Review

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 fromthe following website; http://www.memsnet.org/mems/

(Reference)

M.J. Madou, "Fundamentals of Microfabrication, 2nd ed.", CRC Press, 2002.
S.Franssila, "Introduction to Microfabrication", John Wiley & Sons, 2004.
M. Gad-El-Hak, "The Mems Handbook, 2nd ed.", CRC Pr I Llc, 2006.
G.T.A. Kovacs, "Micromachined Transducers Sourcebook", McGraw-Hill, 1998.

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

(Reference)

M.J. Madou, "Fundamentals of Microfabrication, 2nd ed.", CRC Press, 2002.
S.Franssila, "Introduction to Microfabrication", John Wiley & Sons, 2004.
M. Gad-El-Hak, "The Mems Handbook, 2nd ed.", CRC Pr I Llc, 2006.
G.T.A. Kovacs, "Micromachined Transducers Sourcebook", McGraw-Hill, 1998.

Notes for reference

Goals to be achieved

- To gain an understanding of the fundamentals of micromachining technologies for MEMS and μ TAS

- 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

An oral presentation on micromachining technologies for the fabrication of MEMS and/or μTAS devices will be imposed during the course of class. In addition, the report will be also imposed.

An oral presentation on micromachining technologies for the fabrication of MEMS and/or μTAS devices will be imposed during the course of class. In addition, the report will be also imposed.

Examination

Details of examination

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

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), MEMS, μTAS

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

(M41630050)Biomechanics of Human Locomotion[Biomechanics of Human Locomotion]

Subject name[English]	Biomechanics of Human Locomotion[Biomechanics of Human Locomotion]				
Schedule number	M41630050	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.5～5	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	安田　好文 YASUDA Yoshifumi				
Numbering					

Objectives of class

Biomechnics of human locomotion can be defined as describing, analysing and assessing of human movements by means of the methods of mechanics. This lecture aims to facilitate the understanding on the fundamental mechanics of human locomotion such as walking, running, and cycling based on the structure and function of muscle, skelton and nervous systems.

Biomechnics of human locomotion can be defined as describing, analysing and assessing of human movements by means of the methods of mechanics. This lecture aims to facilitate the understanding on the fundamental mechanics of human locomotion such as walking, running, and cycling based on the structure and function of muscle, skelton and nervous systems.

Contents of class

1. Research objectives and methodologies in the study of biomechanics.
2. Fundamentals of skelton, joint, and ligament systems in the human body.
3. The structure and function of skeletal muscle.
4. Motor control and sensory informatics for human locomotion.
5. Kinematic analyses of human movements.
6. Kinetic analyses of human movements.
7. Electromyography: basic principle and its applications.

1. Research objectives and methodologies in the study of biomechanics.
2. Fundamentals of skelton, joint, and ligament systems in the human body.
3. The structure and function of skeletal muscle.
4. Motor control and sensory informatics for human locomotion.
5. Kinematic analyses of human movements.
6. Kinetic analyses of human movements.
7. Electromyography: basic principle and its applications.

Self Preparation and Review

Related subjects

1. Advanced Exercise Physiology, given by Y. Yasuda in the spring term.

1. Advanced Exercise Physiology, given by Y. Yasuda in the spring term.

Notes for textbook

Handouts will be prepared.
The following book is also referred to;
"Winter D.A.: Biomechanics and Motor Control of Human Movement, Published by John Wiley & Sons, Inc., in 2009"

Handouts will be prepared.
The following book is also referred to;
"Winter D.A.: Biomechanics and Motor Control of Human Movement, Published by John Wiley & Sons, Inc., in 2009"

Notes for reference

Goals to be achieved

1. To understand the use of mechanical principle and methodologies to human movements.
2. To understand the structure and function of muscle, joint and nervous systems in human locomotion.

1. To understand the use of mechanical principle and methodologies to human movements.
2. To understand the structure and function of muscle, joint and nervous systems in human locomotion.

Evaluation of achievement

The summation of the final report (50%) and short reports regarding the topics covered in the lecture (50%).

The summation of the final report (50%) and short reports regarding the topics covered in the lecture (50%).

Examination

Details of examination

Other information

Room: The 2nd floor in the Research Center for Physical Fitness, Sports and Health.
Tel: 0532-44-6631, E-mail: yasuda@las.tut.ac.jp

Room: The 2nd floor in the Research Center for Physical Fitness, Sports and Health.
Tel: 0532-44-6631, E-mail: yasuda@las.tut.ac.jp

Reference URL

http//.www.health.tut.ac.jp

http//.www.health.tut.ac.jp

Office hours

Monday afternoon (PM3:00-5:00)

Monday afternoon (PM3:00-5:00)

Relations to attainment objectives of learning and education

Key words

kinetic, kinematic, locomotion, mechanical efficiency, energy, power, torque

kinetic, kinematic, locomotion, mechanical efficiency, energy, power, torque

(M41630110)Engineering Safety[Engineering Safety]

Subject name[English]	Engineering Safety[Engineering Safety]				
Schedule number	M41630110	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	BATRES PRIETO RAFAELBATRES PRIETO RAFAEL				
Numbering					

Objectives of class

In this course students will learn quantitative and qualitative methods for improving safety of engineered processes and artifacts. The course is based on engineering and science fundamentals such as thermodynamics and statistics. Most of the course focuses on HAZOP as a method to derive potential hazard scenarios. However, this course is also intended to provide a background in managing an overall safety program and its application to industries such as manufacturing, oil and chemical, pharmaceuticals, defense, aerospace, paper, and information technology.

In this course students will learn quantitative and qualitative methods for improving safety of engineered processes and artifacts. The course is based on engineering and science fundamentals such as thermodynamics and statistics. Most of the course focuses on HAZOP as a method to derive potential hazard scenarios. However, this course is also intended to provide a background in managing an overall safety program and its application to industries such as manufacturing, oil and chemical, pharmaceuticals, defense, aerospace, paper, and information technology.

Contents of class

1. Introduction to system safety (week 1)
2. Hazards Scenarios (week 2)
3. Hazards and Operability Studies (week 3)
4. Hazards and Operability Studies (week 4)
5. Case study (week 5)
6. Probabilistic Risk Assessment (week 6)
7. Risk Management (week 7)

1. Introduction to system safety (week 1)
2. Hazards Scenarios (week 2)
3. Hazards and Operability Studies (week 3)
4. Hazards and Operability Studies (week 4)
5. Case study (week 5)
6. Probabilistic Risk Assessment (week 6)
7. Risk Management (week 7)

Self Preparation and Review

Related subjects

Engineering fundamentals, Statistics

Engineering fundamentals, Statistics

Notes for textbook

* Clemens, P. L. and R. J. Simmons. System Safety and Risk Management – A Guide for Engineering Educators. (1998). [Available from the Course Web Page]
* Lee's Loss prevention in the process industries: hazard identification, assessment and control.3rd ed. / [edited by] Sam Mannan (2005)

* Clemens, P. L. and R. J. Simmons. System Safety and Risk Management – A Guide for Engineering Educators. (1998). [Available from the Course Web Page]
* Lee's Loss prevention in the process industries: hazard identification, assessment and control.3rd ed. / [edited by] Sam Mannan (2005)

Notes for reference

Goals to be achieved

Student will be able to:

1. Identify and derive a hazard scenario
2. Generate deviations from the design intent
3. Identify causes of the deviations
3. Identify consequences and their resulting hazards
4. Find and document existing safeguards
5. Propose corrective and preventive actions
6. Determine the amount of risk based on reliability data
7. Describe the risk management process
8. Enumerate the key aspects of social responsibility

Student will be able to:

1. Identify and derive a hazard scenario
2. Generate deviations from the design intent
3. Identify causes of the deviations
3. Identify consequences and their resulting hazards
4. Find and document existing safeguards
5. Propose corrective and preventive actions
6. Determine the amount of risk based on reliability data
7. Describe the risk management process
8. Enumerate the key aspects of social responsibility

Evaluation of achievement

A case study will be assigned in which students will analyze a specific process or artifact using the methods introduced during the course. A final report will be due the last day of the course.

A case study will be assigned in which students will analyze a specific process or artifact using the methods introduced during the course. A final report will be due the last day of the course.

Examination

Details of examination

Other information

Room: D611, Ext: 6716, e-mail: rbp@tut.jp

Room: D611, Ext: 6716, e-mail: rbp@tut.jp

Reference URL

http://ise.me.tut.ac.jp/lectures/safety/

http://ise.me.tut.ac.jp/lectures/safety/

Office hours

I will be available immediately following class. Other office hours by appointment (via email).

I will be available immediately following class. Other office hours by appointment (via email).

Relations to attainment objectives of learning and education

Key words

safety, risk analysis, reliability, social responsibility, ethics in engineering

safety, risk analysis, reliability, social responsibility, ethics in engineering

(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**	1～2
Department Offered				**Beggining grade**	
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.
(Reference)
Y. Shimizu, Z. Zhang, R. Batres, Frontiers in computing technologies for Manufacturing applications, Springer, 2007.
M. Holschneider, "Wavelets and analysis", Oxford University Press.
L. Cohan, "Time-Frequency Analysis", Prentice-Hall PTR.
R.L. Allen, D.W. Mills, "Signal Analysis", IEEE Press.
Materials will be perpared by lecturer.
(Reference)
Y. Shimizu, Z. Zhang, R. Batres, Frontiers in computing technologies for Manufacturing applications, Springer, 2007.
M. Holschneider, "Wavelets and analysis", Oxford University Press.
L. Cohan, "Time-Frequency Analysis", Prentice-Hall PTR.
R.L. Allen, D.W. Mills, "Signal Analysis", IEEE Press.

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 (30%) and term-end report (70%)
Interim report (30%) and term-end report (70%)

Examination

Details of examination

Other information

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

Reference URL

http://is.pse.tut.ac.jp
http://is.pse.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**	Tue.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	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

Fluid mechanics

Notes for textbook

Printed materials are given.
Referenc:Wylie, Streeter, Lisheng, Fluid Transients in Systems, McGraw-Hil

Printed materials are given.
Referenc:Wylie, Streeter, Lisheng, Fluid Transients in Systems, McGraw-Hil

Notes for reference

Goals to be achieved

Transient phenomena that occur in a pipe are understood.
The fundamental theories that describe the dynamic behaviors of fluid in a pipe are understood.

Transient phenomena that occur in a pipe are understood.
The fundamental theories that describe the dynamic behaviors of fluid in a pipe are understood.

Evaluation of achievement

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

Examination

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.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	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 and Nonpremixed combustion
3.Laminar and Turbulent combustion
4.Governing equations
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 and Nonpremixed combustion
3.Laminar and Turbulent combustion
4.Governing equations
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.

(Reference)
Principles of Combustion, Kuo,K.K., John Wiley & Sons

Prints will be distributed.

(Reference)
Principles of Combustion, Kuo,K.K., John Wiley & Sons

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
Details of examination
Other information Room: D411, Tel.(Ext.): 6681, e-mail: noda@mech.tut.ac.jp Room: D411, Tel.(Ext.): 6681, e-mail: noda@mech.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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610010	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Experiment	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S2系教務委員 KAKUKYOUIN Kakukyouin, 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire fundamental knowledge on individual research fields.

To acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

To acquire fundamental knowledge on individual research fields.

To acquire the ability of finding a problem, the ability of solving the problem and the presentation skill.

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M42610030)Advanced Mathematics for EEI[Advanced Mathematics for EEI]

Subject name[English]	Advanced Mathematics for EEI[Advanced Mathematics for EEI]				
Schedule number	M42610030	**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)**	1.5
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The class aims to provide a deep understanding of mathematics based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

The class aims to provide a deep understanding of mathematics based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

Contents of class

First of all, understanding level in mathematics, such as linear algebra, applied analysis, probability and statistics, complex functions, will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

First of all, understanding level in mathematics, such as linear algebra, applied analysis, probability and statistics, complex functions, will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

Self Preparation and Review

Related subjects

linear algebra, applied analysis, probability and statistics, complex functions

linear algebra, applied analysis, probability and statistics, complex functions

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills of mathematics suitable for theoretical analysis in his/hers research field.

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills of mathematics suitable for theoretical analysis in his/hers research field.

Evaluation of achievement

Coursework and report are evaluated generally.

A：over 80, B：over 65, C：over 55

Coursework and report are evaluated generally.

A：over 80, B：over 65, C：over 55
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M42620010)Applied Physics[Applied Physics]

Subject name[English]	Applied Physics[Applied Physics]				
Schedule number	M42620010	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	1.5
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The class aims to provide a deep understanding of applied physics based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

The class aims to provide a deep understanding of applied physics based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

Contents of class

First of all, understanding level in applied physics will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

First of all, understanding level in applied physics will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

Self Preparation and Review

Related subjects

Electromagnetism, Quantum mechanics, Solid state electronics, etc.

Electromagnetism, Quantum mechanics, Solid state electronics, etc.

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire theoretical understanding of the physical meaning of a phenomenon on individual research fields and put theories into practice.
To acquire skills of the analytical ability based on a theory in his/hers research field.

To acquire theoretical understanding of the physical meaning of a phenomenon on individual research fields and put theories into practice.
To acquire skills of the analytical ability based on a theory in his/hers research field.

Evaluation of achievement

Coursework and report are evaluated generally.
A：over 80, B：over 65, C：over 55

Coursework and report are evaluated generally.
A：over 80, B：over 65, C：over 55

Examination

Details of examination

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

(M42620020)Applied Materials Chemistry[Applied Materials Chemistry]

Subject name[English]	Applied Materials Chemistry[Applied Materials Chemistry]				
Schedule number	M42620020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	1.5
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The class aims to provide a deep understanding of materials chemistry based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

The class aims to provide a deep understanding of materials chemistry based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

Contents of class

First of all, understanding level in applied physics will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

First of all, understanding level in applied physics will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

Self Preparation and Review

Related subjects

Inorganic/Organic chemistry, Physical Chemistry, Thermodynamics, Statistical mechanics, Elecrtochemistry

Inorganic/Organic chemistry, Physical Chemistry, Thermodynamics, Statistical mechanics, Elecrtochemistry

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills for analysis and design of materials and processes in his/hers research field.

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills for analysis and design of materials and processes in his/hers research field.

Evaluation of achievement

Coursework and report are evaluated generally.

A：over 80, B：over 65, C：over 55

Coursework and report are evaluated generally.

A：over 80, B：over 65, C：over 55

Examination

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

(M42620030)Applied Circuit Theory[Applied Circuit Theory]

Subject name[English]	Applied Circuit Theory[Applied Circuit Theory]				
Schedule number	M42620030	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	1.5
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The class aims to provide a deep understanding of circuit theory based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

The class aims to provide a deep understanding of circuit theory based on the knowledge in bachelor course to carry out the research work of his/her master thesis in electrical and electronic information engineering.

Contents of class

First of all, understanding level in circuit theory will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

First of all, understanding level in circuit theory will be checked by interview.
In case of a person whose understanding level is already enough, he/she will have practical training.
In case of a person who needs to improve the understanding level, he/she will make a learning program discussing with supervisor and have fundamental training.

Self Preparation and Review

Related subjects

Electric circuit, Electronic circuit, and Logic circuit theory

Electric circuit, Electronic circuit, and Logic circuit theory

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills for circuit analysis and design in his/hers research field.

To acquire theoretical approaches on individual research fields and put theories into practice.
To acquire skills for circuit analysis and design in his/hers research field.

Evaluation of achievement

Coursework and report are evaluated generally.

A：over 80, B：over 65, C：over 55

Coursework and report are evaluated generally. A：over 80, B：over 65, C：over 55
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M42630040)Electrical Technology and Materials[Electrical Technology and Materials]

Subject name[English]	Electrical Technology and Materials[Electrical Technology and Materials]				
Schedule number	M42630040	**Subject area**	Advanced Electrical and Electronic Information 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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	村上 義信, 須田 善行, 稲田 亮史 MURAKAMI Yoshinobu, SUDA Yoshiyuki, INADA Ryoji				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

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

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

Self Preparation and Review

Related subjects

Basic electrical power engineering course is prerequisite.

Basic electrical power engineering course is prerequisite.

Notes for textbook

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

Notes for reference

Goals to be achieved

Evaluation of achievement Marks are based on reports(100%). Marks are based on reports(100%).
Examination
Details of examination
Other information
Reference URL (1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley) (2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag) (3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes) (1) J. Larminie and A. Dicks: Fuel Cell Systems Explained (Wiley) (2) M. Yoshio, R.J. Brodd and A. Kozawa: Lithium Ion Batteries: Science and Technologies (Springer-Verlag) (3) E. Kuffel, W. Zaengel and J. Kuffel: High Voltage Engineering (Newnes)
Office hours
Relations to attainment objectives of learning and education
Key words

(M42630060)LSI Process[LSI Process]

Subject name[English]	LSI Process[LSI Process]				
Schedule number	M42630060	**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.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	澤田 和明, 河野 剛士, 岡田 浩 SAWADA Kazuaki, KAWANO Takeshi, OKADA Hiroshi				
Numbering					

Objectives of class

In electronics, an large scale integrated circuit (also known as LSI, microcircuit, microchip, silicon chip, or chip) is a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) that has been manufactured in the surface of a thin substrate of semiconductor material. Integrated circuits are used in almost all electronic equipment in use today and have revolutionized the world of electronics.
On this lecture, we study LSI fabrication processes, LSI logic circuits components and circuits.

In electronics, an large scale integrated circuit (also known as LSI, microcircuit, microchip, silicon chip, or chip) is a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) that has been manufactured in the surface of a thin substrate of semiconductor material. Integrated circuits are used in almost all electronic equipment in use today and have revolutionized the world of electronics.
On this lecture, we study LSI fabrication processes, LSI logic circuits components and circuits.

Contents of class

1. Introduction to LSI devices
2. MOS transistor theory
3. CMOS processing technology
4. CMOS circuit and logic design
5. Characterization and performance estimation

1. Introduction to LSI devices
2. MOS transistor theory
3. CMOS processing technology
4. CMOS circuit and logic design
5. Characterization and performance estimation

Self Preparation and Review

Related subjects

Electromagnetic theory
Semiconductor Physics
Electromagnetic theory
Semiconductor Physics

Notes for textbook

Reference handouts will be provided in the class.
Reference handouts will be provided in the class.

Notes for reference

Goals to be achieved

To understand the fundamental of the MOS transistor theory and CMOS processing technology.
To apply the knowledge of processing technology to the design of CMOS circuits.
To understand the fundamental of the MOS transistor theory and CMOS processing technology.
To apply the knowledge of processing technology to the design of CMOS circuits.

Evaluation of achievement

Report on specific items given in the lecture (20%).
Term examination on general items shown in the lecture(80%).
Report on specific items given in the lecture (20%).
Term examination on general items shown in the lecture(80%).

Examination

Details of examination

Other information

Kazuaki Sawada, C-605
Takeshi Kawano, C-603
Hiroshi Okada, C-303B
Kazuaki Sawada, C-605
Takeshi Kawano, C-603
Hiroshi Okada, C-303B

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

Semiconductor, MOS transistor, CMOS, circuit, LSI
Semiconductor, MOS transistor, CMOS, circuit, LSI

(M42630090)Methodology of R & D[Methodology of R & D]

Subject name[English]	Methodology of R & D[Methodology of R & D]				
Schedule number	M42630090	**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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

The class aims to provide a basic understanding of R&D methodology related to the electrical and electronic 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 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

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]				
Schedule number	M43610010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Experiment	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

(M43630010)Technical English Presentation[Technical English Presentation]

Subject name[English]	Technical English Presentation[Technical English Presentation]				
Schedule number	M43630010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Year	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員, S3系教務委員 KAKUKYOUIN Kakukyouin, 3kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

B-1F Part time lecture room

B-1F Part time lecture room

Reference URL

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

(M43630040)Networking, Advanced[Networking, Advanced]

Subject name[English]	Networking, Advanced[Networking, Advanced]				
Schedule number	M43630040	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Wed.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	梅村　恭司, 大村　廉 UMEMURA Kyoji, OMURA Ren				
Numbering					

Objectives of class

The objective of this class is mastering both profound and advanced networking technologies. First, precise protocols are lectured to enhance the knowledge of Internet. Then, advanced usage of networking, such as P2P and streaming, will be lectured and some technologies that support
advanced networking will be illustrated.

The objective of this class is mastering both profound and advanced networking technologies. First, precise protocols are lectured to enhance the knowledge of Internet. Then, advanced usage of networking, such as P2P and streaming, will be lectured and some technologies that support
advanced networking will be illustrated.

Contents of class

(Umemura)
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

(Omura)
8. Client/Server and P2P communication
9. Communication – Message passing and RPC –
10. Communication – Streaming and multicast –
11. Naming – Flat naming –
12. Naming – Structured naming –
13. Synchronization 1
14. Synchronization 2

(Umemura)
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

(Omura)
8. Client/Server and P2P communication
9. Communication – Message passing and RPC –
10. Communication – Streaming and multicast –

11. Naming – Flat naming –
12. Naming – Structured naming –
13. Synchronization 1
14. Synchronization 2

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.

Notes for textbook
A: TCP/IP Illustrated Volume. 1, The Protocols,
W. Richard Stevens, Addison-wesley

B: Handouts of lectures will be distributed.

Reference book:
B:Distributed Systems: Principles and Paradigms (2nd Edition)
Andrew S. Tanenbaum, and Maarten Van Steen, Prentice Hall

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

B: Handouts of lectures will be distributed.

Reference book:
B:Distributed Systems: Principles and Paradigms (2nd Edition)
Andrew S. Tanenbaum, and Maarten Van Steen, Prentice Hall

Notes for reference

Goals to be achieved
The goal is to understand differences in various ways of communications and to be able to illustrate some supporting technologies for exploiting them in suitable way.

The goal is to understand differences in various ways of communications and to be able to illustrate some supporting technologies for exploiting them in suitable way.

Evaluation of achievement
Examination will be held in the last class.

Examination will be held in the last class.

Examination

Details of examination

Other information

Kyoji Umemura:
C－304 umemura@tut.ac.jp
Ren Ohmura:
C-509 ren@tut.jp (6750)

Kyoji Umemura:
C－304 umemura@tut.ac.jp
Ren Ohmura:
C-509 ren@tut.jp (6750)

Reference URL

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

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

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

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

Office hours

Kyoji Umemura:
From 9:00AM to 12:00, Tue to The
(Appointment are strongly recommended)

Ren Ohmura:
From 9:00AM to 5:00PM, week days
(Taking appointment is required)

Kyoji Umemura:
From 9:00AM to 12:00, Tue to The
(Appointment are strongly recommended)

Ren Ohmura:
From 9:00AM to 5:00PM, week days
(Taking appointment is required)

Relations to attainment objectives of learning and education

Key words

Computer Network, Distributed Systems
Computer Network, Distributed Systems

(M43630050)Advanced Robotics and Informatics[Advanced Robotics and Informatics]

Subject name[English]	Advanced Robotics and Informatics[Advanced Robotics and Informatics]				
Schedule number	M43630050	**Subject area**	Advanced Computer Science and 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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	岡田 美智男, 三浦 純 OKADA Michio, MIURA Jun				
Numbering					

Objectives of class

Fundamental and advanced issues in next-generation robotics will be discussed. This lecture is composed of two parts. Part I deals with environment recognition by sensor fusion and action planning. Part II deals with social interaction and communication of robots.

Fundamental and advanced issues in next-generation robotics will be discussed. This lecture is composed of two parts. Part I deals with environment recognition by sensor fusion and action planning. Part II deals with social interaction and communication of robots.

Contents of class

Weeks 1-8:(Miura)
- Environment recognition and action planning.
- Bayes filters and decision theory
- Mobile robot localization and mapping
- Action planning under uncertainty

Weeks 9-15: (Okada)
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Social interaction in social robots
- Socially situated learning

Weeks 1-8:(Miura)
- Environment recognition and action planning.
- Bayes filters and decision theory
- Mobile robot localization and mapping
- Action planning under uncertainty

Weeks 9-15: (Okada)
- Situated cognition and biological-inspired robots
- Embodiment and social embeddedness
- Social interaction in social robots
- Socially situated learning

Self Preparation and Review

Related subjects

Fundamentals of linear algebra, probability theory, cognitive science.
Fundamentals of linear algebra, probability theory, cognitive science.

Notes for textbook

Handouts will be prepared.

(References)
- S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2005.
- R. Pfeifer, C. Scheier, Understanding Intelligence, MIT Press, 2001.

Handouts will be prepared.

(References)
- S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2005.
- R. Pfeifer, C. Scheier, Understanding Intelligence, MIT Press, 2001.

Notes for reference

Goals to be achieved

Understanding of the fundamentals of robotics including:
- sensing mechanisms and algorithms for understanding environments,
- cognitive science for biologically-inspired robots and social robots.

Understanding of the fundamentals of robotics including:
- sensing mechanisms and algorithms for understanding environments,
- cognitive science for biologically-inspired robots and social robots.

Evaluation of achievement

Grade will be determined by the report for each area.

Grade will be determined by the report for each area.

Examination

Details of examination

Other information

Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)
Room F-402, Ext, 6886, Email: okada@tut.jp (Michio Okada)

Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)
Room F-402, Ext, 6886, Email: okada@tut.jp (Michio Okada)

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M43630140)Algorithm Engineering, Advanced[Algorithm Engineering, Advanced]

Subject name[English]	Algorithm Engineering, Advanced[Algorithm Engineering, Advanced]				
Schedule number	M43630140	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	藤戸 敏弘 FUJITO Toshihiro				
Numbering					

Objectives of class

To learn various mathematical programming techniques used in attacking combinatorial optimization problems.
If possible, algorithm design techniques for NP-hard optimization problems will be included.

To learn various mathematical programming techniques used in attacking combinatorial optimization problems.
If possible, algorithm design techniques for NP-hard optimization problems will be included.

Contents of class

1. Introduction to combinatorial optimization problems
2. Linear Program (LP)
3. Graph matchings and covers
4. Minimum spanning tree (MST) and greedy method
5. Network flows and cuts
6. NP-completeness
7. LP relaxation, rounding, and primal-dual methods
8. Vertex cover and set cover problems
9. Steiner tree and traveling salesman problems

1. Introduction to combinatorial optimization problems
2. Linear Program (LP)
3. Graph matchings and covers
4. Minimum spanning tree (MST) and greedy method
5. Network flows and cuts
6. NP-completeness
7. LP relaxation, rounding, and primal-dual methods
8. Vertex cover and set cover problems
9. Steiner tree and traveling salesman problems

Self Preparation and Review

Related subjects

Data structures and algorithms, Theory of computation, Formal languages

Data structures and algorithms, Theory of computation, Formal languages

Notes for textbook

References:
A first course in combinatorial optimization, Jon Lee, Cambridge university press, 2004.
Approximation Algorithms, V. Vazirani, Springer, 2001.

References:
A first course in combinatorial optimization, Jon Lee, Cambridge university press, 2004.
Approximation Algorithms, V. Vazirani, Springer, 2001.

Notes for reference

Goals to be achieved

To be able to use and apply systematic approaches to structure analysis and algorithm design for combinatorial optimization problems, such as modeling, duality theory, min-max theorems in mathematical programming.

To be able to use and apply systematic approaches to structure analysis and algorithm design for combinatorial optimization problems, such as modeling, duality theory, min-max theorems in mathematical programming.

Evaluation of achievement

Final exam and assignments

A:80% (or above), B:65% (or above), C:55% (or above)

Final exam and assignments

A:80% (or above), B:65% (or above), C:55% (or above)

Examination

Details of examination

Other information

C-612, 44-6775, fujito@tut.jp

C-612, 44-6775, fujito@tut.jp

Reference URL

http://www.algo.cs.tut.ac.jp/~fujito/class/IEbasic/

http://www.algo.cs.tut.ac.jp/~fujito/class/IEbasic/

Office hours

Mondays 14:40～16:10

Mondays 14:40～16:10

Relations to attainment objectives of learning and education

Key words

combinatorial optimization, mathematical programming, linear program

combinatorial optimization, mathematical programming, linear program

(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.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	小林　良太郎 KOBAYASHI Ryotaro				
Numbering					

Objectives of class

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

Contents of class

The topics of this lecture include the following items.
1. Difference between wire delay and gate delay
2. Limitation of large scale componets
3. Data dependences, control dependences, and resource constraints in pipeline
4. Complexity-effective computer architecture
5. Clustered VLIW
6. Penalty reduction by using value prediction
7. Specialized register read/write mechanism
8. Communication-Parallelism Trace-off in multi processors
9. Flexible shared buffer managed by compiler
10. Instruction level parallelism and thread level parallelism

The topics of this lecture include the following items.
1. Difference between wire delay and gate delay
2. Limitation of large scale componets
3. Data dependences, control dependences, and resource constraints in pipeline
4. Complexity-effective computer architecture
5. Clustered VLIW
6. Penalty reduction by using value prediction
7. Specialized register read/write mechanism
8. Communication-Parallelism Trace-off in multi processors
9. Flexible shared buffer managed by compiler
10. Instruction level parallelism and thread level parallelism

Self Preparation and Review

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

There will be some assignments. There will also be an examination. Attendance to all classes is compulsory. Absence without reasonable excuses will result in some penalty.
There will be some assignments. There will also be an examination. Attendance to all classes is compulsory. Absence without reasonable excuses will result in some penalty.

Examination
Details of examination
Other information Ryotaro Kobayashi Room: C-403 Tel: 6752 email: kobayashi@cs.tut.ac.jp Ryotaro Kobayashi Room: C-403 Tel: 6752 email: kobayashi@cs.tut.ac.jp
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, digital circuits, embedded systems, design automation Computer architecture, digital circuits, embedded systems, design automation

(M43630170)Complex Systems and Intelligent Informatics[Complex Systems and Intelligent Informatics]

Subject name[English]	Complex Systems and Intelligent Informatics[Complex Systems and Intelligent Informatics]				
Schedule number	M43630170	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Wed.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
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

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

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

(M43630200)Advanced Topics in Brain and Cognitive Sciences[Advanced Topics in Brain and Cognitive Sciences]

Subject name[English]	Advanced Topics in Brain and Cognitive Sciences[Advanced Topics in Brain and Cognitive Sciences]				
Schedule number	M43630200	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	北﨑 充晃, 中内 茂樹 KITAZAKI Michiteru, NAKAUCHI Shigeki				
Numbering					

Objectives of class

This lecture focuses on human functions and mechanisms for sensation, perception and cognition (cognitive neuroscience). We can easily sense or perceive objects and environment abound us, but its function and mechanisms in our brain are not easily understood and quite a few of them has not been explained. The purpose of this lecture is to introduce functions and mechanisms for human sensation, perception and cognition, and to discuss recent findings on cognitive neurosciences. Finally, you must propose some technological method or product utilizing human cognitive processing in brain to enhance safety or pleasure in our everyday life.

This lecture focuses on human functions and mechanisms for sensation, perception and cognition (cognitive neuroscience). We can easily sense or perceive objects and environment abound us, but its function and mechanisms in our brain are not easily understood and quite a few of them has not been explained. The purpose of this lecture is to introduce functions and mechanisms for human sensation, perception and cognition, and to discuss recent findings on cognitive neurosciences. Finally, you must propose some technological method or product utilizing human cognitive processing in brain to enhance safety or pleasure in our everyday life.

Contents of class

Lecture 1:(Kitazaki)
Introduction

(Kitazaki,Nakauchi)
Lecture 2-4:
Problem and theory of perception, Psychophysical and physiological research methods
Lecture 5-7:
Spatio-temporal perception, Depth perception, Motion perception
Lecture 8-10:
Mid-level vision, High-level vision, Object recognition, Development
Lecture 11-13:
Attention, Consciousness, Problem solving, Embodied perception
Lecture 14-15:
Ergonomics, Human-machine interface, Virtual reality, Brain-machine interface

Lecture 1:(Kitazaki)
Introduction

(Kitazaki,Nakauchi)
Lecture 2-4:
Problem and theory of perception, Psychophysical and physiological research methods
Lecture 5-7:
Spatio-temporal perception, Depth perception, Motion perception
Lecture 8-10:
Mid-level vision, High-level vision, Object recognition, Development
Lecture 11-13:
Attention, Consciousness, Problem solving, Embodied perception
Lecture 14-15:
Ergonomics, Human-machine interface, Virtual reality, Brain-machine interface

Self Preparation and Review

Related subjects

Bio-physical Information Systems (J. Horikawa, N. Fukumura)

Bio-physical Information Systems (J. Horikawa, N. Fukumura)

Notes for textbook

No textbook is required.

Recommended books are:
「イラストレクチャー認知神経科学」, 村上著, オーム社(Japanese)
"Cognitive Neuroscience", Gazzaniga, Davies, Ivry, and Mangun, WW Norton & Co (3rd International student edition)

No textbook is required.

Recommended books are:
「イラストレクチャー認知神経科学」, 村上著, オーム社(Japanese)
"Cognitive Neuroscience", Gazzaniga, Davies, Ivry, and Mangun, WW Norton & Co (3rd International student edition)

Notes for reference

Goals to be achieved

To understand functions and mechanisms for human sensation, perception and cognition.
To understand and discuss recent scientific findings on cognitive neurosciences.
To propose and design technological methods or products utilizing human cognitive processing in brain to enhance safety or pleasure in our everyday life.

To understand functions and mechanisms for human sensation, perception and cognition.
To understand and discuss recent scientific findings on cognitive neurosciences.
To propose and design technological methods or products utilizing human cognitive processing in brain to enhance safety or pleasure in our everyday life.

Evaluation of achievement

Paper examination (90 min)

Paper examination (90 min)

Examination

Details of examination

Other information

mich@cs.tut.ac.jp

mich@cs.tut.ac.jp

Reference URL

Office hours

Thu, 13:00-14:30

Thu, 13:00-14:30

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

The students will be expected to read textbooks and papers in international journals indicated by his/her supervisor, and report and discuss deeply on his/her research subject in the seminar.

The students will be expected to read textbooks and papers in international journals indicated by his/her supervisor, and report and discuss deeply on his/her research subject in the seminar.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Applied Physical Chemistry I[Applied Physical Chemistry I]				
Schedule number	M44630050	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	松本　明彦 MATSUMOTO Akihiko				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Basic understanding on physical chemistry is desirable.

Basic understanding on physical chemistry is desirable.

Notes for textbook

Reference handouts will be provided in the class.

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

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

Reference handouts will be provided in the class.

(Reference books)

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

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

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

Details of examination

Other information

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

Reference URL

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

Office hours

Relations to attainment objectives of learning and education

Key words

(M44630090)Advanced Composite Science[Advanced Composite Science]

Subject name[English]	Advanced Composite Science[Advanced Composite Science]				
Schedule number	M44630090	**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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	竹市　力 TAKEICHI Tsutomu				
Numbering					

Objectives of class

The objective of this course is to obtain basic understanding of various composite materials by studying them from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

The objective of this course is to obtain basic understanding of various composite materials by studying them from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

Contents of class

(1) FRP: General Purpose FRP and Advanced FRP
? Characteristics and Application ?
(2) Reinforcing Fibers
? Various Types and Characteristics ?
(3) Fabrication of composite materials
(4) Matrix Resin
? Various Types and Characteristics ?
(5) Molecular Composites
? Concept and Possibility as Novel Composite Materials ?
(6) C/C composites
(7) Organic–Inorganic Hybrid Nanocomposites
? Concept, Characteristics, and Possibility as Novel Materials ?
(8) Polymer alloys and polymer blends

(1) FRP: General Purpose FRP and Advanced FRP
? Characteristics and Application ?
(2) Reinforcing Fibers
? Various Types and Characteristics ?
(3) Fabrication of composite materials
(4) Matrix Resin
? Various Types and Characteristics ?
(5) Molecular Composites
? Concept and Possibility as Novel Composite Materials ?
(6) C/C composites
(7) Organic–Inorganic Hybrid Nanocomposites
? Concept, Characteristics, and Possibility as Novel Materials ?
(8) Polymer alloys and polymer blends

Self Preparation and Review

Related subjects

Basic knowledge of polymer synthesis and polymeric materials is desirable.

Basic knowledge of polymer synthesis and polymeric materials is desirable.

Notes for textbook

Handouts will be provided.

Handouts will be provided.

Notes for reference

Goals to be achieved

The goals to be achieved is to obtain basic understanding of various composite materials from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

The goals to be achieved is to obtain basic understanding of various composite materials from the viewpoint of materials chemistry, synthetic chemistry, polymer chemistry, physical chemistry, and inorganic chemistry.

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

Details of examination

Other information

Tsutomu Takeichi: room (B-504), e-mail: takeichi@tutms.tut.ac.jp

Tsutomu Takeichi: room (B-504), e-mail: takeichi@tutms.tut.ac.jp

Reference URL

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http://www.tutms.tut.ac.jp/

Office hours

Relations to attainment objectives of learning and education

Key words

Polymer, Composites, FRP, Thermal and Physical Properties

Polymer, Composites, FRP, Thermal and Physical Properties

(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	Fall1 term	**Day of the week,period**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	平石 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

Interim report (30%) and term-end report (70%) for each major course
Interim report (30%) and term-end report (70%) for each major course

Examination

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

Relations to attainment objectives of learning and education

Key words

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

(M44630170)Advanced Environment Protection Engineering[Advanced Environment Protection Engineering]

Subject name[English]	Advanced Environment Protection Engineering[Advanced Environment Protection Engineering]				
Schedule number	M44630170	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	木曽 祥秋 KISO Yoshiaki				
Numbering					

Objectives of class

Membrane filtration, which is a membrane separation system with pressure difference as a driving force, has been an important solute separation technology for wide variety of water and wastewater treatment processes. Membrane separation process can be understood on the basis of physical chemistry on solution system. In this class, membrane filtration processes will be studied from the following viewpoints: osmosis and reverse osmosis, solvent and solute permeabilities, membrane filtration systems, membrane materials, and the factors controlling mass transfer through a membrane.

Membrane filtration, which is a membrane separation system with pressure difference as a driving force, has been an important solute separation technology for wide variety of water and wastewater treatment processes. Membrane separation process can be understood on the basis of physical chemistry on solution system. In this class, membrane filtration processes will be studied from the following viewpoints: osmosis and reverse osmosis, solvent and solute permeabilities, membrane filtration systems, membrane materials, and the factors controlling mass transfer through a membrane.

Contents of class

1. Classification of membrane separation processes
2. Application of membrane filtration for water and wastewater treatment
3. Driving force for solute permeation and effect of pressure on solute rejection
4. Separation properties of ionic and nonionic solutes
5. Concentration polarization and membrane fouling
6. Membrane separation mechanisms
7. Membrane separation model and effects of physicochemical properties

1. Classification of membrane separation processes
2. Application of membrane filtration for water and wastewater treatment
3. Driving force for solute permeation and effect of pressure on solute rejection
4. Separation properties of ionic and nonionic solutes
5. Concentration polarization and membrane fouling
6. Membrane separation mechanisms
7. Membrane separation model and effects of physicochemical properties

Self Preparation and Review

Related subjects

Physical chemistry, solution system and chemical engineering.

Physical chemistry, solution system and chemical engineering.

Notes for textbook

Some papers will be distributed.

Students can find and refer many kinds of text books on physical chemistry, solution system and membrane separation process in the library

Some papers will be distributed.

Students can find and refer many kinds of text books on physical chemistry, solution system and membrane separation process in the library

Notes for reference

Goals to be achieved

(1) To classify membranes on the basis of solute separation properties
(2) To understand the factors controlling water and solute permeabilities
(3) To understand concentration polarization and membrane fouling
(4) To understand effect of solute properties on membrane separation performance

(1) To classify membranes on the basis of solute separation properties
(2) To understand the factors controlling water and solute permeabilities
(3) To understand concentration polarization and membrane fouling
(4) To understand effect of solute properties on membrane separation performance

Evaluation of achievement

Students should submit short papers and final paper on the subjects given in the class.
Final record is evaluated with weight of 40% of the short papers and of 60% of the final paper.

Students should submit short papers and final paper on the subjects given in the class.
Final record is evaluated with weight of 40% of the short papers and of 60% of the final paper.

Examination

Details of examination

Other information

office: G-403
phone: 6906
e-mail:kiso@ens.tut.ac.jp
office: G-403
phone: 6906
e-mail:kiso@ens.tut.ac.jp

Reference URL

If the students have any questions, please contact me at nay time.
If the students have any questions, please contact me at nay time.

Office hours

Please contact me by telephone or e-mail.
Please contact me by telephone or e-mail.

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

This course will provide the students with the opportunity to study on the selected subject in the realm of 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 type and contents of this course depend on his/her supervisor.

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

It depends on the laboratory. All students must present their thesis at the end of the course and take a final examination on the thesis, as a requirement for the graduation of the master course. The study for the thesis is planned and conducted under the guidance of the supervisor.

It depends on the laboratory. All students must present their thesis at the end of the course and take a final examination on the thesis, as a requirement for the graduation of the master course. The study for the thesis is planned and conducted under the guidance of the supervisor.

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

Relations to attainment objectives of learning and education

Key words

(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**	Mon.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	山田 聖志 YAMADA Seishi				
Numbering					

Objectives of class

This lecture is concerned with the static continuum mechanics of elastic 3-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 3-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

1. Introduction
2. Tensor Analysis in Cartesian Coordinates
2.1 Summation Convention
2.2 Translation of coordinate
2.3 Scalar, Vector and Tensor
2.4 Quotient Rule
3. Stresses and Equilibrium
3.1 Stress
3.2 Equilibrium of Stresses
3.3 Cauchy's Relation
3.4 Principal Stress and Stress Invariant
4. Nonlinear Strain-Displacement Relations in Three-Dimensional Bodies
4.1 Deflection
4.2 Strain
4.3 Compatibility Equations of Strain in Linear Theory
5. Constitutive Equations in Orthotropic and Isotropic Elastic Materials
5.1 Stress-strain Relations of Linear Elastic Bodies
5.2 Orthotropic Material
5.3 Isotropic Material
5.4 Engineering Confidents
6. Non-linear Mechanics of Thin-Walled Plates
6.1 Relation between Strains and Displacements
6.2 Stress Resultants and Constitutive Equations
6.3 Strain Energy
6.4 Principle of Stationary Total Potential Energy
6.5 Nonlinear Deflection Analysis of Rectangular Plates under Uniformly Distributed Vertical Loads
6.6 Increment Method and Newton-Raphson Method
7. Buckling Analysis of Thin-Walled Structures
7.1 Post-buckling Equilibrium States
7.2 Linear Buckling Analysis
7.3 Buckling of Shells and Reduced Stiffness Analysis

1. Introduction
2. Tensor Analysis in Cartesian Coordinates
2.1 Summation Convention
2.2 Translation of coordinate
2.3 Scalar, Vector and Tensor

2.4 Quotient Rule
3. Stresses and Equilibrium
3.1 Stress
3.2 Equilibrium of Stresses
3.3 Cauchy's Relation
3.4 Principal Stress and Stress Invariant
4. Nonlinear Strain-Displacement Relations in Three-Dimensional Bodies
4.1 Deflection
4.2 Strain
4.3 Compatibility Equations of Strain in Linear Theory
5. Constitutive Equations in Orthotropic and Isotropic Elastic Materials
5.1 Stress-strain Relations of Linear Elastic Bodies
5.2 Orthotropic Material
5.3 Isotropic Material
5.4 Engineering Confidents
6. Non-linear Mechanics of Thin-Walled Plates
6.1 Relation between Strains and Displacements
6.2 Stress Resultants and Constitutive Equations
6.3 Strain Energy
6.4 Principle of Stationary Total Potential Energy
6.5 Nonlinear Deflection Analysis of Rectangular Plates under Uniformly Distributed Vertical Loads
6.6 Increment Method and Newton-Raphson Method
7. Buckling Analysis of Thin-Walled Structures
7.1 Post-buckling Equilibrium States
7.2 Linear Buckling Analysis
7.3 Buckling of Shells and Reduced Stiffness Analysis

Self Preparation and Review

Related subjects

Notes for textbook
Printed matter given.
Printed matter given.

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
Two regular tests = 50% and in-class works (or written report) = 50%
Two regular tests = 50% and in-class works (or written report) = 50%

Examination

Details of examination

Other information
Professor Seishi Yamada (D808), e-mail: yamada@ace.tut.ac.jp
Professor Seishi Yamada (D808), e-mail: yamada@ace.tut.ac.jp

Reference URL
http://www.st.ace.tut.ac.jp/~yamada/
http://www.st.ace.tut.ac.jp/~yamada/

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630030)Seismic Evaluation of Existing Buildings[Seismic Evaluation of Existing Buildings]

Subject name[English]	Seismic Evaluation of Existing Buildings[Seismic Evaluation of Existing Buildings]				
Schedule number	M45630030	**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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	眞田 靖士 SANADA Yasushi				
Numbering					

Objectives of class

This course is intended to introduce the Japanese seismic evaluation method for existing buildings, in particular, reinforced concrete buildings. The concept and procedures of this method are outlined in this course, to gain advanced knowledge to evaluate seismic performance of existing buildings.

This course is intended to introduce the Japanese seismic evaluation method for existing buildings, in particular, reinforced concrete buildings. The concept and procedures of this method are outlined in this course, to gain advanced knowledge to evaluate seismic performance of existing buildings.

Contents of class

1st: Introduction
2nd: Procedure of Seismic Evaluation
3rd: Seismic Index of Structure: IS
4th: Irregularity and Time Indexes: SD and T
5th: First Level Screening Procedure
6th: Second Level Screening Procedure –Basic Seismic Index of Structure: E0–
7th: Second Level Screening Procedure –Strength Index: C–
8th: Second Level Screening Procedure –Ductility Index: F–
9th: Judgment on Seismic Safety
10th: Recent Earthquake Disasters
11th: Introduction of Seismic Retrofit
12th: Observation of Retrofitted Buildings
13th: Observation of Structural Testing
14th: Explanation on Assignments

1st: Introduction
2nd: Procedure of Seismic Evaluation
3rd: Seismic Index of Structure: IS
4th: Irregularity and Time Indexes: SD and T
5th: First Level Screening Procedure
6th: Second Level Screening Procedure –Basic Seismic Index of Structure: E0–
7th: Second Level Screening Procedure –Strength Index: C–
8th: Second Level Screening Procedure –Ductility Index: F–
9th: Judgment on Seismic Safety
10th: Recent Earthquake Disasters
11th: Introduction of Seismic Retrofit
12th: Observation of Retrofitted Buildings
13th: Observation of Structural Testing
14th: Explanation on Assignments

Self Preparation and Review

Related subjects

None
None

Notes for textbook

Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001

(Reference)
Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001
Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001

(Reference)
Standard for Seismic Evaluation of Existing Reinforced Concrete Buildings, 2001

Notes for reference

Goals to be achieved
To understand nonlinear structural mechanics through learning the Japanese seismic evaluation method for existing buildings.
To understand nonlinear structural mechanics through learning the Japanese seismic evaluation method for existing buildings.

Evaluation of achievement
Report
Report

Examination

Details of examination

Other information
部　屋：D-807
メール：sanada@ace.tut.ac.jp
部　屋：D-807
メール：sanada@ace.tut.ac.jp

Reference URL
http://rc.ace.tut.ac.jp/sanada/index.html
http://rc.ace.tut.ac.jp/sanada/index.html

Office hours
13:00 to 14:30 on Monday
13:00 to 14:30 on Monday

Relations to attainment objectives of learning and education

Key words

(M45630060)Building Science: Indoor Air Quality and Ventilation[Building Science: Indoor Air Quality and Ventilation]

Subject name[English]	Building Science: Indoor Air Quality and Ventilation[Building Science: Indoor Air Quality and Ventilation]				
Schedule number	M45630060	**Subject area**	Advanced Architecture and Civil 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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	松本　博 MATSUMOTO Hiroshi				
Numbering					

Objectives of class

This course aims at providing the practical strategies to realize a good air environment, mainly indoor air quality and ventilation in buildings. The goal is to help professionals update their knowledge related to new techniques and methods on indoor climate and its control.

This course aims at providing the practical strategies to realize a good air environment, mainly indoor air quality and ventilation in buildings. The goal is to help professionals update their knowledge related to new techniques and methods on indoor climate and its control.

Contents of class

The course is offered as an introduction to a professional-level understanding of indoor air quality control and ventilation method for realizing a good air environment in buildings. The course consists of the following topics:

1. General Introduction to indoor air environment
2. Building related illness and indoor air quality
3. Physical/chemical characteristics of air quality
4. Measurement techniques of air pollutants
5. Modeling of material emission and sorption
6. Prediction method for indoor air quality in rooms
7. CFD analysis of air movement
8. Performance evaluation of ventilation systems
9. Ventilation system design for pollutant control
10. Guidelines, codes and standard
11. Stream of IAQ related R&D (1)
12. Stream of IAQ related R&D (2)
13. Stream of IAQ related R&D (3)
14. Discussion on IAQ related issues
15. Supplementary lecture

The course is offered as an introduction to a professional-level understanding of indoor air quality control and ventilation method for realizing a good air environment in buildings. The course consists of the following topics:

1. General Introduction to indoor air environment
2. Building related illness and indoor air quality
3. Physical/chemical characteristics of air quality
4. Measurement techniques of air pollutants
5. Modeling of material emission and sorption
6. Prediction method for indoor air quality in rooms
7. CFD analysis of air movement
8. Performance evaluation of ventilation systems
9. Ventilation system design for pollutant control
10. Guidelines, codes and standard
11. Stream of IAQ related R&D (1)
12. Stream of IAQ related R&D (2)
13. Stream of IAQ related R&D (3)
14. Discussion on IAQ related issues
15. Supplementary lecture

Self Preparation and Review

Related subjects
Building Climate
Building Climate

Notes for textbook
The related handout will be distributed.
The related handout will be distributed.

Notes for reference

Goals to be achieved
Achievement level of this course is to understand the background of sick building syndrome and the practical strategies to realize a good air environment by controlling indoor air quality and ventilation in buildings, and also propose the healthy and sustainable buildings.
Achievement level of this course is to understand the background of sick building syndrome and the practical strategies to realize a good air environment by controlling indoor air quality and ventilation in buildings, and also propose the healthy and sustainable buildings.

Evaluation of achievement
Reports related to this subject are reviewed to evaluate the achievement level.
Reports related to this subject are reviewed to evaluate the achievement level.

Examination

Details of examination

Other information
Room: D-710, Phone:0532-44-6838, Fax: 0532-44-6831
E-mail: matsu@ace.tut.ac.jp
Room: D-710, Phone:0532-44-6838, Fax: 0532-44-6831
E-mail: matsu@ace.tut.ac.jp

Reference URL
http://einstein.tutrp.tut.ac.jp/
http://einstein.tutrp.tut.ac.jp/

Office hours
Thursday 13:00-14:30
Thursday 13:00-14:30

Relations to attainment objectives of learning and education

Key words
Indoor Air Quality, Healthy Building, Sick Building Syndrome, Ventilation
Indoor Air Quality, Healthy Building, Sick Building Syndrome, Ventilation

(M45630120)Human Settlement: Its History and Theory[Human Settlement: Its History and Theory]

Subject name[English]	Human Settlement: Its History and Theory[Human Settlement: Its History and Theory]				
Schedule number	M45630120	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	泉田 英雄 IZUMIDA Hideo				
Numbering					

Objectives of class

After introducing some basic knowledge on Japanese traditional architecture and city, instructor will describe the modern development of Japanese architecture and city from various points of view; foreign influence and introduction of western technology, architectural education, neo-classic style, modern movement, Ginza Reconstruction and Parliament Building projects, building enactments, response to natural disasters, etc.

After introducing some basic knowledge on Japanese traditional architecture and city, instructor will describe the modern development of Japanese architecture and city from various points of view; foreign influence and introduction of western technology, architectural education, neo-classic style, modern movement, Ginza Reconstruction and Parliament Building projects, building enactments, response to natural disasters, etc.

Contents of class

1. Introduction to Japanese architecture; technical and aesthetic points of view
2. Environment and Natural Resources
3. Early Town Planning and Joka-Machi
4. Buddhist and Shrine Architecture
5. City Excursion
6. Ancient House to Pre-Modern House through Shinden Style, Teahouse Style, Shoin Style
7. Response to Colonialism; naval school, lighthouse, foreign settlement, foreign engineers
8. Employed Foreign Architects and Engineering School; Boinville, Conder, Imperial College, etc.
9. First Generation of Japanese Architects and their roles
10. Earthquake and Architecture
11. City Excursion
12. Modern movement
13. Frank L. Wright and Japanese architects
14. Destruction during the IIWW and the reconstruction
15. Discussion

1. Introduction to Japanese architecture; technical and aesthetic points of view
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14. Destruction during the IIWW and the reconstruction
15. Discussion

Self Preparation and Review

Related subjects

・Knowledge of History of Architecture and City

・Basic knowledge of Japanese history
・Knowledge of History of Architecture and City
・Basic knowledge of Japanese history

Notes for textbook

・K. Franpton and K. Kunio, Japanese Building Practice, CUP
・K. Franpton and K. Kunio, Japanese Building Practice, CUP

Notes for reference

Goals to be achieved

Evaluation of achievement

・Several reports should be submitted.
・Final Presentation
・Several reports should be submitted.
・Final Presentation

Examination

Details of examination

Other information

・Room D3-804, 6861
izumida@tutrp.tut.ac.jp
・Room D3-804, 6861
izumida@tutrp.tut.ac.jp

Reference URL

http://gamac.tutrp.tut.ac.jp/
http://gamac.tutrp.tut.ac.jp/

Office hours

13:30-15:00, Monday, 13:30-15:00, Wednesday. Other than these days, send me your email to take appointment.

13:30-15:00, Monday, 13:30-15:00, Wednesday. Other than these days, send me your email to take appointment.

Relations to attainment objectives of learning and education

Key words

Japanese architecture, modern architecture, urban development
Japanese architecture, modern architecture, urban development

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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Contents of class

Self Preparation and Review

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Notes for reference

Goals to be achieved

Evaluation of achievement

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	各教員 KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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Contents of class

Self Preparation and Review

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Goals to be achieved

Evaluation of achievement

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630270)Water Environment Engineering[Water Environment Engineering]

Subject name[English]	Water Environment Engineering[Water Environment Engineering]				
Schedule number	M45630270	**Subject area**	Advanced Architecture and Civil 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**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	井上 隆信 INOUE Takanobu				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Reports

Reports

Examination

Details of examination

Other information

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

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

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

Key words