Syllabus

International Master′s Degree Program

（2012-Fall Term）

(M40030020)Industrial Policies[Industrial Policies]

Subject name[English]	Industrial Policies[Industrial Policies]				
Schedule number	M40030020	**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 fundamental of input-output analysis and the industrial policy evaluation methodology.
In this course, students learn the fundamental of input-output analysis and the industrial policy evaluation methodology.

Contents of class

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

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

Self Preparation and Review

Related subjects

Economics, Policy, Simulation
Economics, Policy, Simulation

Notes for textbook

Papers will be distributed.

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

Papers will be distributed.

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

Notes for reference

Goals to be achieved

Advanced Input-Output Analysis
Advanced Economic Simulation Methods

Advanced Input-Output Analysis
Advanced Economic Simulation Methods

Evaluation of achievement

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

Examination

Details of examination

Other information

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

Reference URL

Office hours

Tuesday 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

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

Subject name[English]	Culture and Communication I[Culture and Communication I]				
Schedule number	M40030030	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	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]	加藤　三保子 KATOH Mihoko				
Numbering					

Objectives of class

The primary purposes of this class are:
(1) To encourage students to express their views on Japanese culture and society.
(2) To raise the student's awareness of his/her own indigenous culture.
(3) To disseminate information about his/her culture.
The primary purposes of this class are:
(1) To encourage students to express their views on Japanese culture and society.
(2) To raise the student's awareness of his/her own indigenous culture.
(3) To disseminate information about his/her culture.

Contents of class

Students will be offered an overview of contemporary Japanese culture.
Students will read and discuss the topics as follows:

Week 1 Introduction, Ambiguity and the Japanese
Week 2 The way of the warrior
Week 3 Male and female relationships in Japan
Week 4 An implicit way of communicating in Japan
Week 5 Japanese personal space
Week 6 Private vs. public stance in Japan
Week 7 The "Doh" spirit of Japan
Week 8 Japanese patience and determination
Week 9 Japanese social obligations
Week 10 Adopting elements of foreign culture
Week 11 The Japanese virtue of modesty
Week 12 The concept of Japanese dependence
Week 13 Presentation & discussion
Week 14 Presentation & discussion
Week 15 Presentation & discussion

During the term, students will choose a specific cultural issue to research and give a short oral presentation, exchange ideas about their research. At the end of the term, students are required to submit an essay written in English.
Students will be offered an overview of contemporary Japanese culture.
Students will read and discuss the topics as follows:

Week 1 Introduction, Ambiguity and the Japanese
Week 2 The way of the warrior
Week 3 Male and female relationships in Japan
Week 4 An implicit way of communicating in Japan
Week 5 Japanese personal space
Week 6 Private vs. public stance in Japan
Week 7 The "Doh" spirit of Japan
Week 8 Japanese patience and determination
Week 9 Japanese social obligations
Week 10 Adopting elements of foreign culture
Week 11 The Japanese virtue of modesty
Week 12 The concept of Japanese dependence
Week 13 Presentation & discussion
Week 14 Presentation & discussion

Week 15 Presentation & discussion

During the term, students will choose a specific cultural issue to research and give a short oral presentation, exchange ideas about their research. At the end of the term, students are required to submit an essay written in English.

Self Preparation and Review

Related subjects

Notes for textbook

Roger J. Davis & Osamu Ikeno, "The Japanese Mind" (Tuttle Publishing)
ISBN

Roger J. Davis & Osamu Ikeno, "The Japanese Mind" (Tuttle Publishing)
ISBN

Notes for reference

Goals to be achieved

Evaluation of achievement

In-class work 20%, Oral presentation 40%, Written report 40%

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 (N/A)

In-class work 20%, Oral presentation 40%, Written report 40%

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 (N/A)

Examination

Details of examination

Other information

Office：B-511
Phone (ext)：6959
E-mail: mihoko@las.tut.ac.jp

Office：B-511
Phone (ext)：6959
E-mail: mihoko@las.tut.ac.jp

Reference URL

Office hours

available by appointment

available by appointment

Relations to attainment objectives of learning and education

Key words

Japan, Japanese, Culture

Japan, Japanese, Culture

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields.

To develop your research skills including planning and presentation skills.

To get something new on individual research fields.

To develop your research skills including planning and presentation skills.

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

(M41630020)Deformation Processing Technology[Deformation Processing Technology]

Subject name[English]	Deformation Processing Technology[Deformation Processing Technology]				
Schedule number	M41630020	**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]	森　謙一郎 MORI Ken-Ichiro				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Strength of material, Solid mechanics, Numerical methods

Strength of material, Solid mechanics, Numerical methods

Notes for textbook

Handout

Handout

Notes for reference

Goals to be achieved

To understand the finine element method

To understand the finine element method

Evaluation of achievement

Reports of every week, report: 100%
Reports of every week, report: 100%

Examination

Details of examination

Other information

room number: D-606
extension number: 6707
room number: D-606
extension number: 6707

Reference URL

http://plast.me.tut.ac.jp/index.eng.html
http://plast.me.tut.ac.jp/index.eng.html

Office hours

Tuesday
Tuesday

Relations to attainment objectives of learning and education

To understand numerical analysis of solid mechanics

To understand numerical analysis of solid mechanics

Key words

solid mechanics, finite element method, finite difference method
solid mechanics, finite element method, finite difference method

(M41630090)Deformation and Fracture of Materials[Deformation and Fracture of Materials]

Subject name[English]	Deformation and Fracture of Materials[Deformation and Fracture of Materials]				
Schedule number	M41630090	**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]	戸田 裕之 TODA Hiroyuki				
Numbering					

Objectives of class

A presentation is given of the advanced knowledge on the deformation and fracture in engineering materials, including the detailes of the elastic and plastic fracture mechanics as well as general deformation and fracture behaviours of metallic materials, toughening of materials, techniques around fractography and non-destructive testing.

The successful student will learn deep understanding on how micro-structural design can influence the mechanical properties of materials as well as the use of fracture mechanics to quantitatively estimate failure criteria for both elastic and plastically deforming structures.

A presentation is given of the advanced knowledge on the deformation and fracture in engineering materials, including the detailes of the elastic and plastic fracture mechanics as well as general deformation and fracture behaviours of metallic materials, toughening of materials, techniques around fractography and non-destructive testing.

The successful student will learn deep understanding on how micro-structural design can influence the mechanical properties of materials as well as the use of fracture mechanics to quantitatively estimate failure criteria for both elastic and plastically deforming structures.

Contents of class

Topics covered and schedule
First day: Simple continuum mechanics and elasticity; stress, strain and stress concentrations (Toda)
Second day: Ideally brittle and ductile fractures and fracture in ductile and brittle materials (Toda)
Third – fifth days: Linear-elastic fracture mechanics and concept of fracture toughness (Toda)
Sixth day: Resistance-curves (Toda)
Seventh day: Fatigue failure, mechanisms of fatigue in metals
Eighth day: Examination
Topics covered and schedule
First day: Simple continuum mechanics and elasticity; stress, strain and stress concentrations (Toda)
Second day: Ideally brittle and ductile fractures and fracture in ductile and brittle materials (Toda)
Third – fifth days: Linear-elastic fracture mechanics and concept of fracture toughness (Toda)
Sixth day: Resistance-curves (Toda)
Seventh day: Fatigue failure, mechanisms of fatigue in metals
Eighth day: Examination

Self Preparation and Review

Related subjects

Students should have finished a course in mechanics of materials before receiving this class. General knowledge and skills in differential and integral calculus are also needed.
Students should have finished a course in mechanics of materials before receiving this class. General knowledge and skills in differential and integral calculus are also needed.

Notes for textbook

Book for reference: T. L. Anderson, Fracture Mechanics: Fundamentals and Applications, 3rd Edition. CRC Press, 2004.
Book for reference: T. L. Anderson, Fracture Mechanics: Fundamentals and Applications, 3rd Edition. CRC Press, 2004.

Notes for reference

Goals to be achieved

- Deep understanding on deformation and fracture in engineering materials
- Deep understanding on elastic and plastic fracture mechanics
- Understanding on detailed deformation and fracture behaviours of metallic materials, toughening of materials, techniques

around fractography and non-destructive testing
- Applicability of the above knowledge to microstructural design and the fracture mechanics tests
- Estimatimation on precise failure criteria for both elastic and plastically deforming structures

- Deep understanding on deformation and fracture in engineering materials
- Deep understanding on elastic and plastic fracture mechanics
- Understanding on detailed deformation and fracture behaviours of metallic materials, toughening of materials, techniques around fractography and non-destructive testing
- Applicability of the above knowledge to microstructural design and the fracture mechanics tests
- Estimatimation on precise failure criteria for both elastic and plastically deforming structures

Evaluation of achievement

Report(s), possibly presented by each student within the class: 50 %
Examination: 50 %

Report(s), possibly presented by each student within the class: 50 %
Examination: 50 %

Examination

Details of examination

Other information

Toda: D-508, 6697, toda@me.tut.ac.jp
Toda: D-508, 6697, toda@me.tut.ac.jp

Reference URL

http://sp-mac4.pse.tut.ac.jp/
http://sp-mac4.pse.tut.ac.jp/

Office hours

4-5 hours on Monday
4-5 hours on Monday

Relations to attainment objectives of learning and education

Key words

Fracture, Strength, Toughness, Damage, Mechanical Tests
Fracture, Strength, Toughness, Damage, Mechanical Tests

(M41630100)Phase Transformation in Materials[Phase Transformation in Materials]

Subject name[English]	Phase Transformation in Materials[Phase Transformation in Materials]				
Schedule number	M41630100	**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]	梅本 実 UMEMOTO Minoru				
Numbering					

Objectives of class

The development of a set of desirable mechanical characteristics for a material often results from a phase transformation, which is wrought by a heat treatment. It is important to know the time and temperature dependencies of phase transformation in order to design a heat treatment for some alloy that will yield the desired mechanical properties. The purpose of this course is to understand the basic principle of phase transformation such as phase diagram and diffusion theory. Applying such knowledge, students will learn specific transformations such as solidification, diffusional transformation in solids and diffusionless transformations. A part of the class will be given as a seminar style and students will make a practice of oral presentation.

The development of a set of desirable mechanical characteristics for a material often results from a phase transformation, which is wrought by a heat treatment. It is important to know the time and temperature dependencies of phase transformation in order to design a heat treatment for some alloy that will yield the desired mechanical properties. The purpose of this course is to understand the basic principle of phase transformation such as phase diagram and diffusion theory. Applying such knowledge, students will learn specific transformations such as solidification, diffusional transformation in solids and diffusionless transformations. A part of the class will be given as a seminar style and students will make a practice of oral presentation.

Contents of class

Phase transformation in Metals and Alloys will be taught according to the following schedule.
1.Intorduction
2.Thermodynamics and phase Diagrams
3.Diffusion
4.Crystal Interfaces and Microstructure
5.Solidification
6.Diffusional Transformation in Solids
7.Diffusionless Transformations
8.Last Presentation

Phase transformation in Metals and Alloys will be taught according to the following schedule.
1.Intorduction
2.Thermodynamics and phase Diagrams
3.Diffusion
4.Crystal Interfaces and Microstructure
5.Solidification
6.Diffusional Transformation in Solids
7.Diffusionless Transformations
8.Last Presentation

Self Preparation and Review

Related subjects

Notes for textbook

＜Reference＞
" Phase transformations in Metals and Alloys" D.A.Porter and K.E.Eastterling (Chapman and Hall)
"Materials Science and Engineering: An Introduction", William D. Callister, Jr.(John Wiley & Sons, Inc.)

＜Reference＞

" Phase transformations in Metals and Alloys" D.A.Porter and K.E.Eastterling (Chapman and Hall)
"Materials Science and Engineering: An Introduction", William D. Callister, Jr.(John Wiley & Sons, Inc.)

Notes for reference

Goals to be achieved

Learn the background material necessary for understanding phase transformation : thermodynamics, kinetics, diffusion theory and the structure and properties of interfaces. Lean the specific transformations: solidification, diffusional transformation in solids and diffusionless transformation.

Learn the background material necessary for understanding phase transformation : thermodynamics, kinetics, diffusion theory and the structure and properties of interfaces. Lean the specific transformations: solidification, diffusional transformation in solids and diffusionless transformation.

Evaluation of achievement

Presentation(s) (50%) and Report(s)(50%)

Presentation(s) (50%) and Report(s)(50%)

Examination

Details of examination

Other information

umemoto@martens.me.tut.ac.jp
Ext.6709

umemoto@martens.me.tut.ac.jp
Ext.6709

Reference URL

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

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

Office hours

Wednesday, 15:00 ~ 17:00

Wednesday, 15:00 ~ 17:00

Relations to attainment objectives of learning and education

Key words

Materials Science, Materials Engineering, metals, microstructure

Materials Science, Materials Engineering, metals, microstructure

(M41630160)Applied Thermal Engineering[Applied Thermal Engineering]

Subject name[English]	Applied Thermal Engineering[Applied Thermal Engineering]				
Schedule number	M41630160	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	北村　健三 KITAMURA Kenzo				
Numbering					

Objectives of class

The class aims to afford advanced knowledge on heat transfer. The particular concerns will be directed to one or two-dimensional, steady or unsteady conductive heat transfer and also to convective heat transfer by forced convection through pipes and ducts and over flat plates. Through the course of the lecture, we will furnish the ability to calculate the heat transfer rates for simple but practical configurations.

The class aims to afford advanced knowledge on heat transfer. The particular concerns will be directed to one or two-dimensional, steady or unsteady conductive heat transfer and also to convective heat transfer by forced convection through pipes and ducts and over flat plates. Through the course of the lecture, we will furnish the ability to calculate the heat transfer rates for simple but practical configurations.

Contents of class

1st week, Principles of heat conduction, Fourier's law of heat conduction
2nd week, Derivation of conduction equations in rectangular and cylindrical coordinate systems.
3rd week, One-dimensional steady heat conduction through plates and round cylinders.
4th week, Two-dimensional steady heat conduction through plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through plates.
6th week, Principles of convective heat transfer.
7th week, Derivations of governing equations for convective heat transfer.
8th week, Convective heat transfer of laminar flows in pipes and over flat plates.

1st week, Principles of heat conduction, Fourier's law of heat conduction
2nd week, Derivation of conduction equations in rectangular and cylindrical coordinate systems.
3rd week, One-dimensional steady heat conduction through plates and round cylinders.
4th week, Two-dimensional steady heat conduction through plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through plates.
6th week, Principles of convective heat transfer.
7th week, Derivations of governing equations for convective heat transfer.
8th week, Convective heat transfer of laminar flows in pipes and over flat plates.

Self Preparation and Review

Related subjects

Fundamental knowledge on the Fluid Dynamics and the Mathematics for the differential equation is pre-requuisite.

Fundamental knowledge on the Fluid Dynamics and the Mathematics for the differential equation is pre-requuisite.

Notes for textbook

F.P. Incropera and D.P. DeWitt, "Introduction to Heat Transfer, 3rd ed.", John Wiley and Sons.
J.P. Holman、"Heat Transfer, 6th ed." McGraw-Hill

F.P. Incropera and D.P. DeWitt, "Introduction to Heat Transfer, 3rd ed.", John Wiley and Sons.
J.P. Holman、"Heat Transfer, 6th ed." McGraw-Hill

Notes for reference

Goals to be achieved

To be alble to calculate or estimate the heat transfer rates for simple problems.

To be alble to calculate or estimate the heat transfer rates for simple problems.

Evaluation of achievement

Evaluation will be based on the score of final examination.
Evaluation will be based on the score of final examination.

Examination

Details of examination

Other information

Room No.D3-201, E－mail: kitamura@me.tut.ac.jp
Room No.D3-201, E－mail: kitamura@me.tut.ac.jp

Reference URL

Office hours

Anytime from after lecture to 6 PM on the days of lecture.
Anytime from after lecture to 6 PM on the days of lecture.

Relations to attainment objectives of learning and education

Key words

Heat Transfer, Conduction, Convection
Heat Transfer, Conduction, Convection

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

(M41630290)Advanced Aeroacoustics[Advanced Aeroacoustics]

Subject name[English]	Advanced Aeroacoustics[Advanced Aeroacoustics]				
Schedule number	M41630290	**Subject area**	Advanced Mechanical Engineering	**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]	飯田　明由 IIDA Akiyoshi				
Numbering					

Objectives of class
Contents of class
Self Preparation and Review
Related subjects
Notes for textbook
Notes for reference
Goals to be achieved
Evaluation of achievement
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(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]	S2系教務委員, 各教員 2kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire fundamental knowledge on individual research fields.

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

To acquire fundamental knowledge on individual research fields.

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M4261001T)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	M4261001T	**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**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S2系教務委員, 各教員 2kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

To acquire fundamental knowledge on individual research fields.

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

To acquire fundamental knowledge on individual research fields.

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

To get something new on individual research fields

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

To get something new on individual research fields

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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**	Required
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]	S2系教務委員, 各教員 2kei kyomu Iin-S, 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]	S2系教務委員, 各教員 2kei kyomu Iin-S, 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]	S2系教務委員, 各教員 2kei kyomu Iin-S, 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]	S2系教務委員, 各教員 2kei kyomu Iin-S, 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

(M42630010)Material Science for Electronics[Material Science for Electronics]

Subject name[English]	Material Science for Electronics[Material Science for Electronics]				
Schedule number	M42630010	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	石山　武, 中村　雄一, 服部　敏明, 服部　和雄, 武藤　浩行 ISHIYAMA Takeshi, NAKAMURA Yuichi, HATTORI Toshiaki, HATTORI Kazuo, MUTO Hiroyuki				
Numbering					

Objectives of class

Electronic devices are made from great varieties of materials, and by diverse preparation methods. The development of electronic devices requires the extensive knowledge of materials science. In this semester, you learn ceramic science and solution science to understand materials science deeply.

Electronic devices are made from great varieties of materials, and by diverse preparation methods. The development of electronic devices requires the extensive knowledge of materials science. In this semester, you learn ceramic science and solution science to understand materials science deeply.

Contents of class

In Ceramics Science (1. Fundamental of Ceramics, 2.Structures of Ceramics, 3. Properties of Ceramics, and 4. New Techniques of Ceramics Preparation)

1. Traditional Creamics
1.1. Fabrication of Traditional Ceramics
1.2. Diffusion
1.3. Sintering
2. Fine Creamics
2.1. Structural Ceramics
2.2. Functional Ceramics
2.3. Composites
3. Properties of Ceramics
3.1. Mechanical Properties
3.1. Optical Property
3.2. Chemical Property
4. New Technique of Ceramics Preparation

In Solution Science
1 Structure of Water
Phase diagram, Hydrogen bond, Static and dynamic models of water
2 Hydration of Ions in Aqueous Solution
Model of hydrated ion, Thermodynamics for dissolved ion, Local structure near ion
3 Activity of Chemicals
Difference between ideal property and real property, Electrostatic interaction, Activity coefficients
4 Hydrolysis of Metal Ions in Aqueous Solution
Metal ion in aqueous solution, Solubility of metal hydroxide, Polynuclear species, Distribution of hydrolysis products
5 Chemicals in Nonaqueous Solvent
Classification of solvents, Donor–acceptor approach to molecular interaction, Ions in nonaqueous solvent, Acid–base reaction in solvent, Redox reaction in solvent
6 Hydrophobic Interaction
Solubility of hydrocarbon and amphiphilic ion in water and organic solvent, Hydrophobic hydration, Hydrophobic effect
7 Ionic Surfactant and Polyelectrolyte in Aqueous Solution
Adsorption of surfactant at interface, Micelle, Hydophile–lipophile balance, Ion–pair extraction, Polyelectrolyte complex

In Ceramics Science (1. Fundamental of Ceramics, 2.Structures of Ceramics, 3. Properties of Ceramics, and 4. New Techniques of Ceramics Preparation)

1. Traditional Creamics
1.1. Fabrication of Traditional Ceramics
1.2. Diffusion
1.3. Sintering
2. Fine Creamics
2.1. Structural Ceramics
2.2. Functional Ceramics
2.3. Composites
3. Properties of Ceramics
3.1. Mechanical Properties
3.1. Optical Property
3.2. Chemical Property
4. New Technique of Ceramics Preparation

In Solution Science
1 Structure of Water
Phase diagram, Hydrogen bond, Static and dynamic models of water
2 Hydration of Ions in Aqueous Solution
Model of hydrated ion, Thermodynamics for dissolved ion, Local structure near ion
3 Activity of Chemicals
Difference between ideal property and real property, Electrostatic interaction, Activity coefficients
4 Hydrolysis of Metal Ions in Aqueous Solution
Metal ion in aqueous solution, Solubility of metal hydroxide, Polynuclear species, Distribution of hydrolysis products
5 Chemicals in Nonaqueous Solvent
Classification of solvents, Donor–acceptor approach to molecular interaction, Ions in nonaqueous solvent, Acid–base reaction in solvent, Redox reaction in solvent
6 Hydrophobic Interaction
Solubility of hydrocarbon and amphiphilic ion in water and organic solvent, Hydrophobic hydration, Hydrophobic effect
7 Ionic Surfactant and Polyelectrolyte in Aqueous Solution
Adsorption of surfactant at interface, Micelle, Hydophile–lipophile balance, Ion–pair extraction, Polyelectrolyte complex

Self Preparation and Review

Related subjects
Inorganic chemistry, Physical chemistry, Electrochemistry, Analytical chemistry
Inorganic chemistry, Physical chemistry, Electrochemistry, Analytical chemistry

Notes for textbook
No textbook. Lecture notes will be handed out at the first time to the class.
No textbook. Lecture notes will be handed out at the first time to the class.

Notes for reference

Goals to be achieved
Goals to be achieved are to obtain advanced knowledge of ceramics and solution based on materials science.
Goals to be achieved are to obtain advanced knowledge of ceramics and solution based on materials science.

Evaluation of achievement
Term examinations (50%) + reports (50%).
Term examinations (50%) + reports (50%).

Examination

Details of examination

Other information
Email: muto@ee.tut.ac.jp
Email: thattori@ee.tut.ac.jp

Email: muto@ee.tut.ac.jp
Email: thattori@ee.tut.ac.jp

Reference URL

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

(M42630030)Electrical Energy Systems[Electrical Energy Systems]

Subject name[English]	Electrical Energy Systems[Electrical Energy Systems]				
Schedule number	M42630030	**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.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]	長尾　雅行, 滝川　浩史, 櫻井　庸司, 穂積　直裕 NAGAO Masayuki, TAKIKAWA Hirofumi, SAKURAI Yoji, HOZUMI Naohiro				
Numbering					

Objectives of class

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

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

Contents of class

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

Sub Course 2
1. Introduction to Electrochemical Energy Conversion Devices
2. Lithium Secondary Batteries and Fuel Cells
3. Recent Trend in Electrochemical Energy Conversion Devices

Sub Course 3
1. Generation and control of discharge plasma
2. Characteristics and diagnostics of discharge plasma
3. Plasma applications

Sub Course 4
1. Ultrasonic techniques for medical use.
2. Diagnosing techniques for industrial use.
3. Assessment for high voltage insulation system.

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

Sub Course 2
1. Introduction to Electrochemical Energy Conversion Devices
2. Lithium Secondary Batteries and Fuel Cells
3. Recent Trend in Electrochemical Energy Conversion Devices

Sub Course 3
1. Generation and control of discharge plasma
2. Characteristics and diagnostics of discharge plasma
3. Plasma applications

Sub Course 4
1. Ultrasonic techniques for medical use.
2. Diagnosing techniques for industrial use.
3. Assessment for high voltage insulation system.

Self Preparation and Review

Related subjects

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

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

Notes for textbook

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Office: C-309, TEL: 0532-44-6725, E-mail: nagao@tut.jp

Office: C-309, TEL: 0532-44-6725, E-mail: nagao@tut.jp

Reference URL

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

Electric Energy, Electric Power. High Voltage, Secondary Battery, Fuel Cell, Plasma, Electrical Insulation

Electric Energy, Electric Power. High Voltage, Secondary Battery, Fuel Cell, Plasma, Electrical Insulation

(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.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]	須田　善行, 稲田　亮史 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

(M42630050)Semiconductor Physics[Semiconductor Physics]

Subject name[English]	Semiconductor Physics[Semiconductor Physics]				
Schedule number	M42630050	**Subject area**	Advanced Electrical and Electronic Information 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]	若原 昭浩, 岡田 浩 WAKAHARA Akihiro, OKADA Hiroshi				
Numbering					

Objectives of class

From the viewpoint of deep understanding of semiconductor devices, semiconductor physics and theory of operation on fundamental devices are lectured.

From the viewpoint of deep understanding of semiconductor devices, semiconductor physics and theory of operation on fundamental devices are lectured.

Contents of class

1. Physics and Properties of Semiconductors
  Crystal structure
  Energy bands
  Carrier concentration at Thermal equilibrium
Carrier transport phenomena
Basic equations for semiconductor device operation

2. p-n junction diode
Depletion region
Current-Voltage characteristics
Junction breakdown
Transient behavior
Terminal functions
Heterojunction

3.Metal-Semiconductor Contacts
Schottky barrier
Current transport processes
Ohmic contact

4.LED and Semiconductor Lasers
radiative transitions
LED
Semiconductor laser

1. Physics and Properties of Semiconductors
  Crystal structure
  Energy bands
  Carrier concentration at Thermal equilibrium
Carrier transport phenomena
Basic equations for semiconductor device operation

2. p-n junction diode
Depletion region
Current-Voltage characteristics
Junction breakdown

Transient behavior
Terminal functions
Heterojunction

3.Metal-Semiconductor Contacts
Schottky barrier
Current transport processes
Ohmic contact

4.LED and Semiconductor Lasers
radiative transitions
LED
Semiconductor laser

Self Preparation and Review

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

Notes for textbook
Physics of Semiconducotr Devices
S.M.Sze, Willy
Physics of Semiconducotr Devices
S.M.Sze, Willy

Notes for reference

Goals to be achieved
To understand the fundamental of the semiconductor physics and semiconductor devices.
To apply the knowledge of design and analysis of semiconductor devices.
To understand the fundamental of the semiconductor physics and semiconductor devices.
To apply the knowledge of design and analysis of semiconductor devices.

Evaluation of achievement
Reports (50%) and Final examination (50%)
Reports (50%) and Final examination (50%)

Examination

Details of examination

Other information
Akihiro Wakahara, C-608
wakahara[at]ee.tut.ac.jp

Takeshi Kawano, C-603
karano[at]ee.tut.ac.jp

Akihiro Wakahara, C-608
wakahara[at]ee.tut.ac.jp

Takeshi Kawano, C-603
karano[at]ee.tut.ac.jp

Reference URL
http://www.int.eee.tut.ac.jp/
http://www.int.eee.tut.ac.jp/

Office hours
contact by e-mail
contact by e-mail

Relations to attainment objectives of learning and education

Key words

Solid-state electronics, semiconductor physics, photo diode, light-emitting diode, laser diode

Solid-state electronics, semiconductor physics, photo diode, light-emitting diode, laser diode

(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**	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]	石田 誠, 澤田 和明, 河野 剛士, 村上 裕二 ISHIDA Makoto, SAWADA Kazuaki, KAWANO Takeshi, MURAKAMI Yuji				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Semiconductor Physics, Master course

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

Semiconductor Physics, Master course

Notes for textbook

Physics of Semiconducotr Devices
S.M.Sze, Willy

Physics of Semiconducotr Devices
S.M.Sze, Willy

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

M.Ishida (C-606)

ishida@ee.tut.ac.jp
ext. 6741
K.Sawada (C-605)
sawada@ee.tut.ac.jp
T.Kawano (C-603)
kawano@ee.tut.ac.jp
Yu.Murakami (C-606)
ymurakami@ee.tut.ac.jp
M.Ishida (C-606)
ishida@ee.tut.ac.jp
ext. 6741
K.Sawada (C-605)
sawada@ee.tut.ac.jp
T.Kawano (C-603)
kawano@ee.tut.ac.jp
Yu.Murakami (C-606)
ymurakami@ee.tut.ac.jp

Reference URL

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

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

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

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

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

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

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

(M42630083)Advanced Electronic Information System[Advanced Electronic Information System]

Subject name[English]	Advanced Electronic Information System[Advanced Electronic Information System]				
Schedule number	M42630083	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	市川 周一 ICHIKAWA Shuichi				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

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

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

Self Preparation and Review

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

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

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

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

Notes for reference

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

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

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

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

Examination

Details of examination

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

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

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

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

Relations to attainment objectives of learning and education

Key words

(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]	S2系教務委員, 各教員 2kei kyomu Iin-S, 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]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M4361003T	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

Subject name[English]	Seminar on Computer Science and Engineering[Seminar on Computer Science and Engineering]				
Schedule number	M43610040	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Experiment	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	S3系教務委員, 各教員 3kei kyomu Iin-S, KAKUKYOUIN Kakukyouin				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

Details of examination

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

(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.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]	石黒　ひとみ ISHIGURO Hitomi				
Numbering					

Objectives of class

文法・語法を確認しながら、ビジネスシーンや雑談をダイアログを通して学び、
伝えたいことを的確に話せる会話力へと向上させる。
文法・語法を確認しながら、ビジネスシーンや雑談をダイアログを通して学び、
伝えたいことを的確に話せる会話力へと向上させる。

Contents of class

This class is mainly for Japanese students.
Knowledge of Japanese, spoken as well as written is required.

＜後期＞
シーン別本当に使える実践ビジネス英会話

Contents
1 Chapter 1 At the Workplace Greetings The First Meeting
　　Introducing Others
2 Telephone Conversation Calling/Picking up the Phone
　　Wrong Number
3 Giving Directions to the Office
　　Setting up an Appintment
4 Chapter 2 At Meetings & Presentations Discussions Conveying Your Ideas 1
　　Conveying Your Ideas 2
5 Seeking an Opinion 1
　　Seeking an Opinion 2
6 Chapter 4 At a Business Lunch/Dinner Party Arriving at the Party/ Being Introduced
　　Joining Another Party
7 Chapter 5 Miscellaneous Conversation Topics Small Talk Weather/ Hometown/ Family

8 Housing/ Shopping 1
　　Housing/ Shopping 2
9 Hobbies & Entertainment Music
　　Movies
10 Theater
　　Sports
11 Karaoke
　　Travelling
12 Cultural Differences Husband-alone Transfer
13 Marriage
14 Parenting
15 Education

後期試験

＜前期＞
使用テキスト：Skills for Better Writing Revised Edition
構文で書くエッセイ＜改訂版＞(南雲堂)他

Context
1. Conclusion/ Reasons　　理由で押し切る！
2. Analysis　　ブームを考える
3. Theory/ Proof　　説得は実験で
4. Controversy　　賛成？ 反対？
5. Comparison/ Contrast　　比べてみよう
6. Classification　　きちんと分類
7. Instructions　　アドバイスを与える
8. Chronological Order (History) 歴史をたどる
9. Cause& Effect　　原因を探る
10. Process　　手順を説明する
11. Explanation(New Product)　　新製品の紹介
12. Definition　　最近気になる言葉を考えよう
13. Explanation(Statistics)　　データで説明

前期試験

This class is mainly for Japanese students.
Knowledge of Japanese, spoken as well as written is required.

＜後期＞
シーン別本当に使える実践ビジネス英会話

Contents
1 Chapter 1 At the Workplace Greetings The First Meeting
　　Introducing Others
2 Telephone Conversation Calling/Picking up the Phone
　　Wrong Number
3 Giving Directions to the Office
　　Setting up an Appintment
4 Chapter 2 At Meetings & Presentations Discussions Conveying Your Ideas 1
　　Conveying Your Ideas 2
5 Seeking an Opinion 1
　　Seeking an Opinion 2
6 Chapter 4 At a Business Lunch/Dinner Party Arriving at the Party/ Being Introduced
　　Joining Another Party
7 Chapter 5 Miscellaneous Conversation Topics Small Talk Weather/ Hometown/ Family

8 Housing/ Shopping 1
　　Housing/ Shopping 2
9 Hobbies & Entertainment Music
　　Movies
10 Theater
　　Sports
11 Karaoke
　　Travelling
12 Cultural Differences Husband-alone Transfer
13 Marriage
14 Parenting
15 Education

後期試験

＜前期＞
使用テキスト：Skills for Better Writing Revised Edition
構文で書くエッセイ＜改訂版＞(南雲堂)他

Context
1. Conclusion/ Reasons　　理由で押し切る！

2. Analysis　　ブームを考える
3. Theory/ Proof　　説得は実験で
4. Controversy　　賛成？ 反対？
5. Comparison/ Contrast　　比べてみよう
6. Classification　　きちんと分類
7. Instructions　　アドバイスを与える
8. Chronological Order (History) 歴史をたどる
9. Cause& Effect　　原因を探る
10. Process　　手順を説明する
11. Explanation(New Product)　　新製品の紹介
12. Definition　　最近気になる言葉を考えよう
13. Explanation(Statistics)　　データで説明

前期試験

Self Preparation and Review

Related subjects

Notes for textbook
＜後期＞
シーン別本当に使える実践ビジネス英会話
＜前期＞
Skills for Better Writing Revised Edition 構文で書くエッセイ＜改訂版＞(南雲堂)他

＜後期＞
シーン別本当に使える実践ビジネス英会話
＜前期＞
Skills for Better Writing Revised Edition 構文で書くエッセイ＜改訂版＞(南雲堂)他

Notes for reference

Goals to be achieved
・既習の文法事項を用いて、伝えたいことを話せる。
・自分の考えを Introduction, Body, Conclusion の構造でまとめることができる。
・既習の文法事項を用いて、伝えたいことを話せる。
・自分の考えを Introduction, Body, Conclusion の構造でまとめることができる。

Evaluation of achievement
後期試験(50%)、前期試験(50%)を総合し、評価する。

・基礎的な文法、構文を用いて自分の考えを的確に表現する。　50%
・Introduction, Body, Conclusion の構造でエッセイを書く。　50%

後期試験(50%)、前期試験(50%)を総合し、評価する。

・基礎的な文法、構文を用いて自分の考えを的確に表現する。　50%
・Introduction, Body, Conclusion の構造でエッセイを書く。　50%

Examination

Details of examination

Other information
非常勤講師室

hi41@quartz.ocn.ne.jp

講義後、もしくは E メールでコンタクトしてください。

非常勤講師室
hi41@quartz.ocn.ne.jp

講義後、もしくは E メールでコンタクトしてください。

Reference URL

Office hours

Relations to attainment objectives of learning and education

表現力、コミュニケーション力を身につける。

表現力、コミュニケーション力を身につける。

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.jp
Ren Ohmura:
C-509 ren@tut.jp (6750)

Kyoji Umemura:
C－304 umemura@tut.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 10:00AM to 13:00, Tue to Fri
(Appointment are strongly recommended)

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

Kyoji Umemura:
From 10:00AM to 13:00, Tue to Fri
(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 scene 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 scene recognition by sensor fusion and action planning. Part II deals with social interaction and communication of robots.

Contents of class

Weeks 1-8:(Miura)
- Scene 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)
- Scene 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

(M43630103)Image Processing, Advanced[Image Processing, Advanced]

Subject name[English]	Image Processing, Advanced[Image Processing, Advanced]				
Schedule number	M43630103	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	金澤 靖, 菅谷 保之 KANAZAWA Yasushi, SUGAYA Yasuyuki				
Numbering					

Objectives of class

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

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

Contents of class

1-2: Fundamentals on projective geometry
3-4: Camera model
5-7: Epipolar geometry
8-10: 3-D reconstruction from two views
11-13: 3-D reconstruction from many views
14-15: Advanced issues
1-2: Fundamentals on projective geometry
3-4: Camera model
5-7: Epipolar geometry
8-10: 3-D reconstruction from two views
11-13: 3-D reconstruction from many views
14-15: Advanced issues

Self Preparation and Review

Related subjects

Geometry, Linear Algebra, Statistics.
Geometry, Linear Algebra, Statistics.

Notes for textbook

Handouts will be prepared.

(References)

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

Handouts will be prepared.

(References)

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Grade will be determined by some reports for each area.

Grade will be determined by some reports for each area.

Examination

Details of examination

Other information

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

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

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

image processing, computer vision

image processing, computer vision

(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]	増山 繁 MASUYAMA Shigeru				
Numbering					

Objectives of class

To learn knowledge and skill on advanced computer science and engineering.

To learn knowledge and skill on advanced computer science and engineering.

Contents of class

Lectures are given 15 times.

Each time a student is requested to give a presentation on selected topics in Advanced computer science and engineering.

Lectures are given 15 times.

Each time a student is requested to give a presentation on selected topics in Advanced computer science and engineering.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Acquire advanced knowledge on advanced computer science and engineering

Acquire advanced knowledge on advanced computer science and engineering

Evaluation of achievement

Presentation:50%

assignment (report): 50%

Presentation:50%

assignment (report): 50%

Examination

Details of examination

Other information

F503, masuyama@tut.jp

F503, masuyama@tut.jp

Reference URL

Office hours

Please make a reservation in advance by e-mail.

Please make a reservation in advance by e-mail.

Relations to attainment objectives of learning and education

Key words

computer science

(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

10/9, 10/16: Difference between wire delay and gate delay
10/23: Limitation of large scale componets
10/30, 11/6: Data dependences, control dependences, and resource constraints in pipeline
11/13: Complexity-effective computer architecture
11/20: Clustered VLIW
12/4, 12/11: Penalty reduction by using value prediction
1/8: Specialized register read/write mechanism
1/15,1/22: Communication-Parallelism Trace-off in multi processors
1/29: Flexible shared buffer managed by compiler
2/12, 2/19: Instruction level parallelism and thread level parallelism
10/9, 10/16: Difference between wire delay and gate delay
10/23: Limitation of large scale componets
10/30, 11/6: Data dependences, control dependences, and resource constraints in pipeline
11/13: Complexity-effective computer architecture
11/20: Clustered VLIW
12/4, 12/11: Penalty reduction by using value prediction
1/8: Specialized register read/write mechanism
1/15,1/22: Communication-Parallelism Trace-off in multi processors
1/29: Flexible shared buffer managed by compiler
2/12, 2/19: 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, 村越　一支 ISHIDA Yoshiteru, MURAKOSHI Kazushi				
Numbering					

Objectives of class

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

Contents of class

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

1st 2nd week: A
3rd 4th week: B
5th 6th week: C
7th 8th week: D
9th 10th week: E
11th week: F
12th 13th week: G
14th 15th week: H I

A. Introduction
What is complex and intelligent systems? Outline of the brain system.
B. Computational Neuroscience and Application-oriented Mathematical Models
What is computational Neuroscience and artificial neural networks?
C. Model Neurons
Structure of neurons, synapse, model neurons.
D. Learning at connected part of neurons (synapse)
Synaptic plasticity, spike-timing-dependent plasticity (STDP).
E. Simulation Methods
Numerical calculation methods for single neuron, neural network from single neuron.
F. Simulation Environments
Explanation and demonstration of simulation environments such as NEURON and GENESIS.

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

1st 2nd week: A
3rd 4th week: B
5th 6th week: C
7th 8th week: D
9th 10th week: E
11th week: F
12th 13th week: G
14th 15th week: H I

Self Preparation and Review

Related subjects

Notes for textbook
Handouts are distributed.

Handouts are distributed.

Notes for reference

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

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

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

Examination

Details of examination

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

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

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

Office hours
After this class
After this class

Relations to attainment objectives of learning and education
Key words

(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.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]	中内 茂樹, 北﨑 充晃 NAKAUCHI Shigeki, KITAZAKI Michiteru				
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, 11:00-12:00
Thu, 11:00-12:00

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor
Supervisor

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

To be able to make safety control in experimental work

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor(s)

Supervisor(s)

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

(M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	Advanced Polymer Chemistry[Advanced Polymer Chemistry]				
Schedule number	M44630070	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	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]	伊津野 真一 ITSUNO Shinichi				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Organic Chemistry
Polymer chemistry
Organic Chemistry
Polymer chemistry

Notes for textbook

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

Notes for reference

Goals to be achieved

1)To understand radical polymerization of vinyl monomers

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

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

Details of examination

Other information

B－502
6813
itsuno@ens.tut.ac.jp

B－502
6813
itsuno@ens.tut.ac.jp

Reference URL

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

Office hours

Any time
Any time

Relations to attainment objectives of learning and education

Key words

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

(M44630080)Advanced Polymer Engineering[Advanced Polymer Engineering]

Subject name[English]	Advanced Polymer Engineering[Advanced Polymer Engineering]				
Schedule number	M44630080	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Fri.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]	吉田　絵里 YOSHIDA Eri				
Numbering					

Objectives of class

1.To acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid.
2.To understand molecular self-assembly in vivo and in vitro.
1.To acquire knowledge of advanced polymer syntheses including well-controlled polymerizations and heterogeneous polymerizations in supercritical fluid.
2.To understand molecular self-assembly in vivo and in vitro.

Contents of class

1. Advanced polymer syntheses
1) Controlled radical polymerization 1
2) Controlled radical polymerization 2
3) Molecular design through living radical polymerization
4) Heterogeneous polymerizations
5) Polymerization in supercritical carbon dioxide

2. Molecular self-assembly
1) Theory of molecular self-assembly 1: Surfactnat
2) Theory of molecular self-assembly 2: Vital tissue
3) Artificial supramolecules

1. Advanced polymer syntheses
1) Controlled radical polymerization 1
2) Controlled radical polymerization 2
3) Molecular design through living radical polymerization
4) Heterogeneous polymerizations
5) Polymerization in supercritical carbon dioxide

2. Molecular self-assembly
1) Theory of molecular self-assembly 1: Surfactnat
2) Theory of molecular self-assembly 2: Vital tissue
3) Artificial supramolecules

Self Preparation and Review

Related subjects

Basic knowledge of polymer chemistry is desirable.
Basic knowledge of polymer chemistry is desirable.

Notes for textbook

No textbook is needed.
No textbook is needed.

Notes for reference

Goals to be achieved To understand cutting-edge technology based on well-defined polymers. To understand cutting-edge technology based on well-defined polymers.
Evaluation of achievement Tests and a term-end report Tests and a term-end report
Examination
Details of examination
Other information Eri Yoshida; room: B-503, Tel: 6814, e-mail: eyoshida@ens.tut.ac.jp Eri Yoshida; room: B-503, Tel: 6814, e-mail: eyoshida@ens.tut.ac.jp
Reference URL http://www.ens.tut.ac.jp/~eyoshida http://www.ens.tut.ac.jp/~eyoshida
Office hours Anytime Anytime
Relations to attainment objectives of learning and education
Key words Free-radical polymerization, Living radical polymerization, Molecular self-assembly Free-radical polymerization, Living radical polymerization, Molecular self-assembly

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

Subject name[English]	Advanced Molecular Life Science[Advanced Molecular Life Science]				
Schedule number	M44630120	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	菊池 洋, 田中 照通 KIKUCHI Yo, TANAKA Terumichi				
Numbering					

Objectives of class

This course will provide students with the opportunity to read excellent research papers on molecular life science. Therefore, the knowledge of basic biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are not qualified for this course.
The papers in the textbook are important papers from that current molecular life science were originated. The students will be required to read, summarize and present one or two research papers in the textbook each week.
This course will provide students with the opportunity to read excellent research papers on molecular life science. Therefore, the knowledge of basic biochemistry and molecular biology is absolutely necessary. If you have not completed these subjects, you are not qualified for this course.
The papers in the textbook are important papers from that current molecular life science were originated. The students will be required to read, summarize and present one or two research papers in the textbook each week.

Contents of class

The Program will go with the textbook.
The textbook includes the following subjects:

1. Structure and Expression of Genes (Chromatin, Immunoglobulin genes, Mitochondria genome)
2. Development of "RNA World" (Splicing, Ribozymes, Retroviruses, RNA Editing)
3. Protein Structure and Function (Protein-DNA interaction, Leucine zipper, Chaperon protein)
4. Advanced Biotechnology (Gene engineering, Sequencing, PCR, Gene synthesis)

The Program will go with the textbook.
The textbook includes the following subjects:

1. Structure and Expression of Genes (Chromatin, Immunoglobulin genes, Mitochondria genome)
2. Development of "RNA World" (Splicing, Ribozymes, Retroviruses, RNA Editing)
3. Protein Structure and Function (Protein-DNA interaction, Leucine zipper, Chaperon protein)
4. Advanced Biotechnology (Gene engineering, Sequencing, PCR, Gene synthesis)

Self Preparation and Review

Related subjects

Advanced Applied Biochemistry and Biotechnology
Advanced Applied Biochemistry and Biotechnology

Notes for textbook

(textbook)
"Selected Papers in Molecular Biology", Eds, K. Maruyama, K. Watanabe and I. Katsura, Kodansha-Scientific (1995)
(Papers included)
List of Papers (that all students commonly have to read, without any choice)

1.Science, 184, 865-868 (1974) R. D. Kornberg, et al., Chromatin structure: oligomers of the histones.
Science, 184, 868-871 (1974) R. D. Kornberg, Chromatin structure: a repeating unit of histones and DNA.

2.Proc. Natl. Acad.Sci. USA, 73, 3628-3632 (1976) N. Hozumi, et al.
Evidence for somatic rearrangement of immunoglobulin genes coding for variable and constant regions.

3.Nature, 290, 457–465 (1981) S. Anderson, et al.
Sequence and organization of the human mitochondrial genome.

4.Cell, 27, 299–308 (1981) J. Banerji, et al.
Expression of a beta-globulin gene is enhanced by remote SV40 DNA sequence.

5.Science, 232, 203–210 (1986) J. Nathans, et al.
Molecular genetics of inherited variation in human color vision.

6.Proc. Natl. Acad. Sci. USA, 74, 3171–3175 (1977) S. M. Berget, et al.
Spliced segments at the 5' terminus of adenovirus 2 late mRNA.

7.Science, 236, 1532–1539 (1987) T. R. Cech
The chemistry of self-splicing RNA and RNA enzymes.

8.Nature, 260, 170–173 (1976) D. Stehelin, et al.
DNA related to the transforming gene(s) of avian sarcoma viruses is present in normal avian DNA.

9.Trends Biochem. Sci., 16, 68–72 (1991) K. Stuart
RNA editing in mitochondrial mRNA of trypanosomatids.

10.Nature, 290, 754–758 (1981) W. F. Anderson, et al.
Structure of the cro repressor from bacteriophage λ and its interaction with DNA.

11.Science, 240, 1759–1764 (1988) W. H. Landschultz, et al.
The leucine zipper: a hypothetical structure common to a new class of DNA binding proteins.

12.Nature, 342, 884–889 (1989) P. Goloubinoff, et al.
Reconstitution of active dimeric ribulose bisphosphate carboxylase ~~~~~ Mg-ATP.

13.Proc. Natl. Acad. Sci. USA, 70, 3240–3244 (1973) S. N. Cohen, et al.
Construction of biologically functional bacterial plasmids in vitro.

14.Proc. Natl. Acad. Sci. USA, 74, 560–564 (1977) A. M. Maxam, et al.
A new method for sequencing DNA.

15.Science, 239, 487–491 (1988) R. K. Saiki, et al.
Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase.

16.Cell, 15, 687–701 (1978) T. Maniatis, et al.
The isolation of structural genes from libraries of eukaryotic DNA.

17.Science, 198, 1056–1063 (1977) K. Itakura, et al.
Expression in Escherichia coli of a chemically synthesized gene for the hormone somatostatin.

(textbook)
"Selected Papers in Molecular Biology", Eds, K. Maruyama, K. Watanabe and I. Katsura, Kodansha-Scientific (1995)
(Papers included)
List of Papers (that all students commonly have to read, without any choice)

1.Science, 184, 865–868 (1974) R. D. Kornberg, et al., Chromatin structure: oligomers of the histones.
Science, 184, 868–871 (1974) R. D. Kornberg, Chromatin structure: a repeating unit of histones and DNA.

2.Proc. Natl. Acad.Sci. USA, 73, 3628–3632 (1976) N. Hozumi, et al.
Evidence for somatic rearrangement of immunoglobulin genes coding for variable and constant regions.

3.Nature, 290, 457–465 (1981) S. Anderson, et al.

Sequence and organization of the human mitochondrial genome.

4.Cell, 27, 299–308 (1981) J. Banerji, et al.
Expression of a beta-globulin gene is enhanced by remote SV40 DNA sequence.

5.Science, 232, 203–210 (1986) J. Nathans, et al.
Molecular genetics of inherited variation in human color vision.

6.Proc. Natl. Acad. Sci. USA, 74, 3171–3175 (1977) S. M. Berget, et al.
Spliced segments at the 5' terminus of adenovirus 2 late mRNA.

7.Science, 236, 1532–1539 (1987) T. R. Cech
The chemistry of self-splicing RNA and RNA enzymes.

8.Nature, 260, 170–173 (1976) D. Stehelin, et al.
DNA related to the transforming gene(s) of avian sarcoma viruses is present in normal avian DNA.

9.Trends Biochem. Sci., 16, 68–72 (1991) K. Stuart
RNA editing in mitochondrial mRNA of trypanosomatids.

10.Nature, 290, 754–758 (1981) W. F. Anderson, et al.
Structure of the cro repressor from bacteriophage λ and its interaction with DNA.

11.Science, 240, 1759–1764 (1988) W. H. Landschultz, et al.
The leucine zipper: a hypothetical structure common to a new class of DNA binding proteins.

12.Nature, 342, 884–889 (1989) P. Goloubinoff, et al.
Reconstitution of active dimeric ribulose bisphosphate carboxylase ~~~~~ Mg-ATP.

13.Proc. Natl. Acad. Sci. USA, 70, 3240–3244 (1973) S. N. Cohen, et al.
Construction of biologically functional bacterial plasmids in vitro.

14.Proc. Natl. Acad. Sci. USA, 74, 560–564 (1977) A. M. Maxam, et al.
A new method for sequencing DNA.

15.Science, 239, 487–491 (1988) R. K. Saiki, et al.
Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase.

16.Cell, 15, 687–701 (1978) T. Maniatis, et al.
The isolation of structural genes from libraries of eukaryotic DNA.

17.Science, 198, 1056–1063 (1977) K. Itakura, et al.
Expression in Escherichia coli of a chemically synthesized gene for the hormone somatostatin.

Notes for reference

Goals to be achieved

The goal is to be able to deeply understand excellent papers and modern history of molecular life science.
The goal is to be able to deeply understand excellent papers and modern history of molecular life science.

Evaluation of achievement

Grades for the course will be based on the test score or the report and presentation score.
Grades for the course will be based on the test score or the report and presentation score.

Examination

Details of examination

Other information

Kikuchi: Room: G-507, Phone: 6903, E-mail: kikuchi@tut.jp

Kikuchi: Room: G-507, Phone: 6903, E-mail: kikuchi@tut.jp

Reference URL

http://www.tut.ac.jp/teach/main.php?mode=detail&article=362#english

http://www.tut.ac.jp/teach/main.php?mode=detail&article=362#english

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

Molecular Biology, RNA, DNA

Molecular Biology, RNA, DNA

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

Objectives of class
Contents of class
Self Preparation and Review
Related subjects
Notes for textbook
Notes for reference
Goals to be achieved
Evaluation of achievement
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

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

Objectives of class
Contents of class
Self Preparation and Review
Related subjects
Notes for textbook
Notes for reference
Goals to be achieved
Evaluation of achievement
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

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

Objectives of class
Contents of class
Self Preparation and Review
Related subjects
Notes for textbook
Notes for reference
Goals to be achieved
Evaluation of achievement
Examination
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

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

Subject name[English]	Special Topics in Inorganic Chemistry[Special Topics in Inorganic Chemistry]				
Schedule number	M44630270	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	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]	角田 範義 KAKUTA Noriyoshi				
Numbering					

Objectives of class

The chemistry and physics of surfaces is an increasingly important subject. Because of this, there is a need for chemists to become familiar with the basic concepts and principles governing interfacial phenomena for understanding "Heterogeneous Catalysis". The concept of "adsorption" is emphasized. The measurement of BET surface area is also demonstrated.

The chemistry and physics of surfaces is an increasingly important subject. Because of this, there is a need for chemists to become familiar with the basic concepts and principles governing interfacial phenomena for understanding "Heterogeneous Catalysis". The concept of "adsorption" is emphasized. The measurement of BET surface area is also demonstrated.

Contents of class

Gas adsorption at solid surfaces
1. Some basic definitions
2. The Langmuir adsorption isotherm
3. Heats of adsorption
4. The BET isotherm
5. Experiment: measurement of BET surface area

The Catalytic process
Catalysis by metals, oxides and sulfides

Gas adsorption at solid surfaces
1. Some basic definitions
2. The Langmuir adsorption isotherm
3. Heats of adsorption
4. The BET isotherm
5. Experiment: measurement of BET surface area

The Catalytic process
Catalysis by metals, oxides and sulfides

Self Preparation and Review

Related subjects

Basic knowledge of physical chemistry is required.

Basic knowledge of physical chemistry is required.

Notes for textbook

No official textbook is used.
Hand out materials accordingly.

No official textbook is used.

Hand out materials accordingly.

Notes for reference

Goals to be achieved

To understand basics of adsorption phenomena for heterogeneous catalysis

To understand basics of adsorption phenomena for heterogeneous catalysis

Evaluation of achievement

30% Homework report, 70% Final examination or report

30% Homework report, 70% Final examination or report

Examination

Details of examination

Other information

Room # B-302, E-mail: kakuta@ens.tut.ac.jp,

Room # B-302, E-mail: kakuta@ens.tut.ac.jp,

Reference URL

Office hours

Anytime when I will be.

Anytime when I will be.

Relations to attainment objectives of learning and education

Key words

adsorption, solid surface, heterogeneous catalysis

adsorption, solid surface, heterogeneous catalysis

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

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

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

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

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

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

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

Research on architecture and civil engineering

Research on architecture and civil engineering

Contents of class

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

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

Self Preparation and Review

Related subjects

It depends on the laboratory

It depends on the laboratory

Notes for textbook

It depends on the laboratory

It depends on the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

It depends on the laboratory.

It depends on the laboratory.

Reference URL

It depends on the laboratory.

It depends on the laboratory.

Office hours

It depends on the laboratory

It depends on the laboratory

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M45630020)Finite Element Method for Continua and Bar Structures[Finite Element Method for Continua and Bar Structures]

Subject name[English]	Finite Element Method for Continua and Bar Structures[Finite Element Method for Continua and Bar Structures]				
Schedule number	M45630020	**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]	中澤 祥二 NAKAZAWA Shoji				
Numbering					

Objectives of class

The course provides fundamentals for static analysis and computer programming for simple bar, such as truss structures.
The course provides fundamentals for static analysis and computer programming for simple bar, such as truss structures.

Contents of class

1. Fields for application and fundamentals of elasticity
2.1 Virtual work for displacement field applied to bars
2.2 Minimum potential energy principle for displacement field applied to bars
3. Stiffness method for truss structures
4. Load matrix for truss structures
5. Global equation and solution for linear equations with multi-degrees of freedom
6. Structure of FEM program
7. Examples for analysis
8. Introduction for extension to 2D elements
1. Fields for application and fundamentals of elasticity
2.1 Virtual work for displacement field applied to bars
2.2 Minimum potential energy principle for displacement field applied to bars
3. Stiffness method for truss structures
4. Load matrix for truss structures
5. Global equation and solution for linear equations with multi-degrees of freedom
6. Structure of FEM program
7. Examples for analysis
8. Introduction for extension to 2D elements

Self Preparation and Review

Related subjects

Notes for textbook

Robert D. Cook: Concepts and Applications of finite Element Analysis

(Reference)
Robert D. Cook: Concepts and Applications of finite Element Analysis

(Reference)

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination 50%, home work 50%
Examination 50%, home work 50%

Examination

Details of examination

Other information

Contact to Shoji Nakazawa :
Room : D-816, Phone :6857
E-mail : nakazawa@ace.tut.ac.jp

Contact to Shoji Nakazawa :
Room : D-816, Phone :6857
E-mail : nakazawa@ace.tut.ac.jp

Reference URL

http://www.st.ace.tut.ac.jp/~nakazawa
http://www.st.ace.tut.ac.jp/~nakazawa

Office hours

Thursday 15:15 to 16:30
Thursday 15:15 to 16:30

Relations to attainment objectives of learning and education

Key words

(M45630050)Geotechnical Analysis[Geotechnical Analysis]

Subject name[English]	Geotechnical Analysis[Geotechnical Analysis]				
Schedule number	M45630050	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered				**Beggining grade**	
Charge teacher name[Roman alphabet mark]	三浦 均也 MIURA Kinya				
Numbering					

Objectives of class

Understand the concept of analytical methods for flow problem in geotechnical engineering, and master the associated mathematical calculation methods.

Understand the concept of analytical methods for flow problem in geotechnical engineering, and master the associated mathematical calculation methods.

Contents of class

Introductory guidance
01. Fundamentals of trigonometric function
02. Unification of trigonometric function and exponential function
03. Fourier series
04. Complex Fourier series
05. Expansion of Fourier analysis
Midterm exam
06. Governing equation for flow problem
07. Exact solution of 1-D steady problem
08. Solution by means of Fourier Transformation for 1-D Steady Problem
09. Solution for Steady 2-D and 3-D steady problem
10. Exact solution of 2-D flow problem
11. Numerical solution by means of Weighted Residuals Method (WRM)
12. Numerical solution by means of Finite Difference Method (FDM)
13. Numerical solution by means of Finite Element Method (FEM)
Term-end exam

Introductory guidance
01. Fundamentals of trigonometric function
02. Unification of trigonometric function and exponential function
03. Fourier series
04. Complex Fourier series
05. Expansion of Fourier analysis
Midterm exam
06. Governing equation for flow problem
07. Exact solution of 1-D steady problem
08. Solution by means of Fourier Transformation for 1-D Steady Problem
09. Solution for Steady 2-D and 3-D steady problem
10. Exact solution of 2-D flow problem
11. Numerical solution by means of Weighted Residuals Method (WRM)
12. Numerical solution by means of Finite Difference Method (FDM)
13. Numerical solution by means of Finite Element Method (FEM)
Term-end exam

Self Preparation and Review

Related subjects

Geolpgic hazards and mitigation planning (English Masre course)

Geolpgic hazards and mitigation planning (English Masre course)

Notes for textbook

Handouts are distributed at the lectures
Handouts are distributed at the lectures

Notes for reference

Goals to be achieved

Understanding the basic concspt of analytical method fo flow problems in geotechnical analysis.
Understanding the basic concspt of analytical method fo flow problems in geotechnical analysis.

Evaluation of achievement

The achievement is evaluated based on the report.
The achievement is evaluated based on the report.

Examination

Details of examination

Other information

D803, Tel: 0532-44-6844, Mail: k-miura@ace.tut.ac.jp
D803, Tel: 0532-44-6844, Mail: k-miura@ace.tut.ac.jp

Reference URL

under preparing
under preparing

Office hours

12:00-14:00 on Wednesday
12:00-14:00 on Wednesday

Relations to attainment objectives of learning and education

not specified

not specified

Key words

Disaster,Geologic Hazards, Mitigation Plannning, Region
Disaster,Geologic Hazards, Mitigation Plannning, Region

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

Subject name[English]	Computer Applications in Urban Planning[Computer Applications in Urban Planning]				
Schedule number	M45630110	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	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]	大貝 彰 OGAI Akira				
Numbering					

Objectives of class

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

Contents of class

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

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

Details of examination

Other information Akira Ohgai: room (D-706), e-mail: aohgai@ace.tut.ac.jp Akira Ohgai: room (D-706), e-mail: aohgai@ace.tut.ac.jp
Reference URL http://urban.ace.tut.ac.jp/ http://urban.ace.tut.ac.jp/
Office hours
Relations to attainment objectives of learning and education
Key words

(M45630160)Modeling Regional Environment[Modeling Regional Environment]

Subject name[English]	Modeling Regional Environment[Modeling Regional Environment]				
Schedule number	M45630160	**Subject area**	Advanced Architecture and Civil 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]	宮田 譲 MIYATA Yuzuru				
Numbering					

Objectives of class

To undestand the analysis of regional economic activities.
To understand the interaction between the natural environment and the regional economy.
To undestand the analysis of regional economic activities.
To understand the interaction between the natural environment and the regional economy.

Contents of class

This class discusses the interaction between the natural environment and the regional economic activities by employing mathematical/numerical models. Details of the lecture are described as follows:

Topics
1. The first and second lectures; integrated environmental and economic accounting
2. The third and fourth lectures; waste and economic accounting matrix
3. The fifth to seventh lectures; computable general equilibrium analysis of a regional environmental and economic system
4. The eighth to tenth lectures; an intertemporal model of a regional environmental and economic system
5. The eleventh and twelfth lectures; environmental tax and the emissions trading
6. The thirteenth to fifteenth lectures; sustainable growth in the environmental and economic dynamics

This class discusses the interaction between the natural environment and the regional economic activities by employing mathematical/numerical models. Details of the lecture are described as follows:

Topics
1. The first and second lectures; integrated environmental and economic accounting
2. The third and fourth lectures; waste and economic accounting matrix
3. The fifth to seventh lectures; computable general equilibrium analysis of a regional environmental and economic system
4. The eighth to tenth lectures; an intertemporal model of a regional environmental and economic system
5. The eleventh and twelfth lectures; environmental tax and the emissions trading
6. The thirteenth to fifteenth lectures; sustainable growth in the environmental and economic dynamics

Self Preparation and Review

Related subjects

microeconomics (undergraduate), macroeconomics(undergraduate), environmental economics (master course)
microeconomics (undergraduate), macroeconomics(undergraduate), environmental economics (master course)

Notes for textbook

Lecture materials are distributed to students as handout. Powerpoint files are available for students as well.
Lecture materials are distributed to students as handout. Powerpoint files are available for students as well.

Notes for reference

Goals to be achieved

By applying mathematical/numerical models;
To undestand the analysis of regional economic activities.
To understand the interaction between the natural environment and the regional economy.
By applying mathematical/numerical models;
To undestand the analysis of regional economic activities.
To understand the interaction between the natural environment and the regional economy.

Evaluation of achievement

Students are evaluated by the term report (100%).

Students are evaluated by the term report (100%).

Examination

Details of examination

Other information

room # : B411
phone : 0532-44-6955
e-mail address : miyata@ace.tut.ac.jp
room # : B411
phone : 0532-44-6955
e-mail address : miyata@ace.tut.ac.jp

Reference URL

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

Office hours

16:00 to 17:00 on every Tuesday
16:00 to 17:00 on every Tuesday

Relations to attainment objectives of learning and education

Key words

computable general equilibrium model, global environmental problems, regional sustainable development
computable general equilibrium model, global environmental problems, regional sustainable development

(M45630170)Management of Technology[Management of Technology]

Subject name[English]	Management of Technology[Management of Technology]				
Schedule number	M45630170	**Subject area**	Advanced Architecture and Civil 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]	藤原 孝男 FUJIWARA Takao				
Numbering					

Objectives of class

The main objective is to understand the function of technological entrepreneurship for commercialization of basic research from a perspective of financial engineering.
Especially the decision-making model is examined for irreversible investment under uncertainty.

The main objective is to understand the function of technological entrepreneurship for commercialization of basic research from a perspective of financial engineering.
Especially the decision-making model is examined for irreversible investment under uncertainty.

Contents of class

From a view point of regarding the technological development as risky but promising investment, this class has following topics:
1)Technological Entrepreneurship,
2)Technological Management Decision,
3)Investment Science,
4)Real Options,
5)Game Theory,
6)Eco-system for high-tech entrepreneurship or start-ups.

From a view point of regarding the technological development as risky but promising investment, this class has following topics:
1)Technological Entrepreneurship,
2)Technological Management Decision,
3)Investment Science,
4)Real Options,
5)Game Theory,
6)Eco-system for high-tech entrepreneurship or start-ups.

Self Preparation and Review

Related subjects

Management Science (English), Operations Management (Japanese), & Social Infrastructure Management (Japanese).
Management Science (English), Operations Management (Japanese), & Social Infrastructure Management (Japanese).

Notes for textbook

Educational materials will be introduced at first class.
Educational materials will be introduced at first class.

Notes for reference

Goals to be achieved

Main goal is to draw a creative business plan for transformation of technological ideas into economic value.
Especially risk-hedge model is understood for irreversible investment under uncertainty.
Simultaneously competitiveness is also needed for survival.
Main goal is to draw a creative business plan for transformation of technological ideas into economic value.
Especially risk-hedge model is understood for irreversible investment under uncertainty.
Simultaneously competitiveness is also needed for survival.

Evaluation of achievement

Scoring is based on the semester report in terms of originality, academic contribution, and practical usefulness.

Scoring is based on the semester report in terms of originality, academic contribution, and practical usefulness.

Examination

Details of examination

Other information

Office#: B-313, Phone#: 6946, e-mail: fujiwara@ace.tut.ac.jp
Office#: B-313, Phone#: 6946, e-mail: fujiwara@ace.tut.ac.jp

Reference URL

Office hours

After4:00 PM on Weekdays
After4:00 PM on Weekdays

Relations to attainment objectives of learning and education

Key words

Real Options, Game Theory, & Technological Entreprneurship
Real Options, Game Theory, & Technological Entreprneurship

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seismic Design of Structures[Seismic Design of Structures]				
Schedule number	M45630290	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	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]	齊藤　大樹 SAITOH Taiki				
Numbering					

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

None

None

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Report

Report

Examination

Details of examination

Other information

Reference URL

http://www.rc.ace.tut.ac.jp/matsui/index.html

http://www.rc.ace.tut.ac.jp/matsui/index.html

Office hours

Relations to attainment objectives of learning and education

Key words