Syllabus

International Master′s Degree Program

（2014-Fall Term）

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

その他

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Mechanical Engineering[Thesis Research on Mechanical Engineering]				
Schedule number	M4161003T	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M41610050)Internship[Internship]

Subject name[English]	Internship[Internship]				
Schedule number	M41610050	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	0
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員, 内山　直樹 1kei kyomu Iin-S, UCHIYAMA Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Prepare well for internship projects by contacting industrial supervisors.

Prepare well for internship projects by contacting industrial supervisors.

Related subjects

Depend on participating internship projects.

Depend on participating internship projects.

Notes for textbook

May be prepared by participating industries.

May be prepared by participating industries.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Determined based on internship project evaluation sheets, internship project reports, survey reports of internship project and internship project presentation.
A: 80 or over (out of 100)
B: 65-79
C: 55-64

Determined based on internship project evaluation sheets, internship project reports, survey reports of internship project and internship project presentation.
A: 80 or over (out of 100)
B: 65-79
C: 55-64

Examination

その他
Other

Details of examination

Submission of internship project reports and presentation are required.

Submission of internship project reports and presentation are required.

Other information

Contact Uchiyama by e-mail for inquiry.

Contact Uchiyama by e-mail for inquiry.

Reference URL

Office hours

Contact Uchiyama by e-mail first.

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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	Mechanical Engineering			**Beggining grade**	M1, M2
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: Summary

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

Self Preparation and Review

solid mechanics

solid mechanics

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 finite element method

To understand the finite element method

Evaluation of achievement Reports of every week Reports of every week
Examination レポートで実施 By Report
Details of examination solid mechanics, calculation using finite element method, numerical methods, etc. solid mechanics, calculation using finite element method, numerical methods, etc.
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 the numerical analysis in solid mechanics To understand the numerical analysis in solid mechanics
Key words forming processes, solid mechanics, finite element method forming processes, solid mechanics, finite element method

(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	Mechanical Engineering			**Beggining grade**	M1, M2
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. Particular concerns will be directed to the heat tansfer by conduction and by convection. In the former subject, one or two-dimensional, steady or unsteady conduction problems will be treated. While, in the latter subject, the forced convection from pipes,ducts and flat plates will be treated. Through the course of the lecture, we will furnish the ability to calculate practical problems concerned with the conduction and convection.

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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 circular cylinders.
4th week, Two-dimensional steady heat conduction through the plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through the 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.

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2nd week, Derivation of conduction equations in rectangular and cylindrical coordinate systems.
3rd week, One-dimensional steady heat conduction through plates and circular cylinders.
4th week, Two-dimensional steady heat conduction through the plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through the 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

Pre and after homework will be neccesary to persuit the class. For the sake of this, problems for homework will be given in every lecture.

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Related subjects

Bachelor level knowledge on "Fluid Dynamics", "Engineering Thermodynamics" and "Mathematics of differential equation" are pre-requisite.Otherwise, student can not follow the lecture.

Bachelor level knowledge on "Fluid Dynamics", "Engineering Thermodynamics" and "Mathematics of differential equation" are pre-requisite.Otherwise, student can not follow the lecture.

Notes for textbook

Reference1	**Book title**	Introduction to Heat Transfer, 3rd ed.			**ISBN**	
	Author	F.P. Incropera and D.P. DeWitt	**Publisher**	John Wiley and Sons.	**Publish year**	
Reference2	**Book title**	Heat Transfer, 6th ed.			**ISBN**	
	Author	J.P. Holman	**Publisher**	McGraw-Hill	**Publish year**	

Notes for reference

Goals to be achieved

Able to calculate or estimate the heat transfer rates by conduction and convection for practical problems.

Able to calculate or estimate the heat transfer rates by conduction and convection for practical problems.

Evaluation of achievement

Evaluation will be based on the scores of test and final report.

Evaluation will be based on the scores of test and final report.

Examination

レポートで実施

By Report

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

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

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Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced System, Control and Robotics I[Advanced System, Control and Robotics I]				
Schedule number	M41630250	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	飯田　明由 IIDA Akiyoshi				
Numbering					

Objectives of class

To get basic knowledge of aeroacoustics and noise reduction technique for aerodynamic noise.
To get basic knowledge of aeroacoustics and noise reduction technique for aerodynamic noise.

Contents of class

Basic theory of the flow induced noise will be lectured, and experimental and numerical technique for aeroacoustics will be received.

1. Principle of sound and noise(1)
2. Principle of sound and noise(2)
3. Lighthill Theory
4. Curle's Theory
5. Theory of vortex sound
6. Prediction of aerodynamic sound from a bluff body
7. Identification method of aerodynamic noise source
8. Measurement technique for aerodynamic sound

Basic theory of the flow induced noise will be lectured, and experimental and numerical technique for aeroacoustics will be received.

1. Principle of sound and noise(1)
2. Principle of sound and noise(2)
3. Lighthill Theory
4. Curle's Theory
5. Theory of vortex sound
6. Prediction of aerodynamic sound from a bluff body
7. Identification method of aerodynamic noise source
8. Measurement technique for aerodynamic sound

Self Preparation and Review

Please read handouts before the lecture.
Please read your notes again for review of lecture.
Please read handouts before the lecture.
Please read your notes again for review of lecture.

Related subjects

Fluid dynamics
Fluid dynamics

Notes for textbook

No Textbook is required

No Textbook is required

Notes for reference

Goals to be achieved

To understand the generation mechanism of aeroadynamic noise.

To understand the principle of Lighthill Theory.
To understand the generation mechanism of aeroadynamic noise.
To understand the principle of Lighthill Theory.

Evaluation of achievement

Report 100 %
Report 100 %

Examination

レポートで実施
By Report

Details of examination

Other information

room D-410
e-mail:iida@mech.tut.ac.jp
room D-410
e-mail:iida@mech.tut.ac.jp

Reference URL

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

Office hours

Monday 13:00-15:00
Monday 13:00-15:00

Relations to attainment objectives of learning and education

Key words

Aeroacousitcs, Turbulence, Sound Wave
Aeroacousitcs, Turbulence, Sound Wave

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

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

Objectives of class

This class is separated into two parts:

Prof. Mori

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

Prof. Adachi

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

This class is separated into two parts:

Prof. Mori

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

Prof. Adachi

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

Contents of class

Prof. Mori

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

Prof. Adachi

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

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

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

Self Preparation and Review

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

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

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

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

Notes for reference

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

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

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

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

Evaluation of achievement

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

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

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

Examination

レポートで実施
By Report

Details of examination

Other information

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

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advances in Thermal and Fluid Mechanics[Advances in Thermal and Fluid Mechanics]				
Schedule number	M41630350	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.2 ～ 2,Thu.2 ～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	飯田　明由, 北村　健三 IIDA Akiyoshi, KITAMURA Kenzo				
Numbering					

Objectives of class

The class aims to afford advanced knowledge on heat transfer. Particular concerns will be directed to the heat tansfer by conduction and by convection. In the former subject, one or two-dimensional, steady or unsteady conduction problems will be treated. While, in the latter subject, the forced convection from pipes,ducts and flat plates will be treated. Through the course of the lecture, we will furnish the ability to calculate practical problems concerned with the conduction and convection.

To get basic knowledge of aeroacoustics and noise reduction technique for aerodynamic noise.

The class aims to afford advanced knowledge on heat transfer. Particular concerns will be directed to the heat tansfer by conduction and by convection. In the former subject, one or two-dimensional, steady or unsteady conduction problems will be treated. While, in the latter subject, the forced convection from pipes,ducts and flat plates will be treated. Through the course of the lecture, we will furnish the ability to calculate practical problems concerned with the conduction and convection.

To get basic knowledge of aeroacoustics and noise reduction technique for aerodynamic noise.

Contents of class

Prof. Kitamura
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 circular cylinders.
4th week, Two-dimensional steady heat conduction through the plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through the 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.

Prof.Iida
1st week, Principle of sound and noise(1)
2nd week, Principle of sound and noise(2)
3rd week, Lighthill Theory
4th week, Curle's Theory
5th week, Theory of vortex sound
6th week, Prediction of aerodynamic sound from a bluff body
7th week, Identification method of aerodynamic noise source
8th week, Measurement technique for aerodynamic sound

Prof. Kitamura
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 circular cylinders.
4th week, Two-dimensional steady heat conduction through the plates of finite sizes.
5th week, One-dimensional unsteady heat conduction through the 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.

Prof.Iida

1st week, Principle of sound and noise(1)
2nd week, Principle of sound and noise(2)
3rd week, Lighthill Theory
4th week, Curle's Theory
5th week, Theory of vortex sound
6th week, Prediction of aerodynamic sound from a bluff body
7th week, Identification method of aerodynamic noise source
8th week, Measurement technique for aerodynamic sound

Self Preparation and Review

Pre and after homework will be neccesary to persuit the class. Homework problems will be given in every lecture.
Pre and after homework will be neccesary to persuit the class. Homework problems will be given in every lecture.

Related subjects

Bachelor level knowledge on "Fluid Dynamics", "Engineering Thermodynamics" and "Mathematics of differential equation" are pre-requisite.Otherwise, student can not follow the lecture.
Bachelor level knowledge on "Fluid Dynamics", "Engineering Thermodynamics" and "Mathematics of differential equation" are pre-requisite.Otherwise, student can not follow the lecture.

Notes for textbook

Reference1	**Book title**	Introduction to Heat Transfer, 3rd ed.			**ISBN**	
	Author	F.P. Incropera and D.P. DeWitt	**Publisher**	John Wiley and Sons.	**Publish year**	
Reference2	**Book title**	Heat Transfer, 6th ed.			**ISBN**	
	Author	J.P. Holman	**Publisher**	McGraw-Hill	**Publish year**	
Reference3	**Book title**	Theory of Vortex Sound			**ISBN**	
	Author	M.S Howe	**Publisher**	Cambridge Univ. Press	**Publish year**	

Notes for reference

Goals to be achieved

Able to calculate or estimate the heat transfer rates by conduction and convection for practical problems.

Able to calculate or estimate the aerodynamic saound for practical problems.
Able to calculate or estimate the heat transfer rates by conduction and convection for practical problems.

Able to calculate or estimate the aerodynamic saound for practical problems.

Evaluation of achievement

Evaluation will be based on the scores of test and final report.
Evaluation will be based on the scores of test and final report.

Examination

レポートで実施
By Report

Details of examination

Other information

Room No.D3-201, E－mail: kitamura@me.tut.ac.jp
Room No.D410, E－mail: iida@me.tut.ac.jp
Room No.D3-201, E－mail: kitamura@me.tut.ac.jp
Room No.D410, E－mail: iida@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, Aerocynamic Sound
Heat Transfer, Conduction, Convection, Aerocynamic Sound

(M41630360)Modeling and Analysis of Dynamical Control Systems[Modeling and Analysis of Dynamical Control Systems]

Subject name[English]	Modeling and Analysis of Dynamical Control Systems[Modeling and Analysis of Dynamical Control Systems]				
Schedule number	M41630360	**Subject area**	Advanced Mechanical 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**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	寺嶋　一彦 TERASHIMA Kazuhiko				
Numbering					

Objectives of class

Modeling and control of dynamical systems is lectured.In particular, physical modeling of various processes is explained and identification method is also explained by means of experiment data and information technique when physical modeling is impossible. Then, analysis of systems is lectured concerning state vector equation, solution, controllability , observability, staility and realization. Furthermore, modern control thory such as optimal control and state estimation
is explained. Finally, robust control of H-infinity is lectured.

Modeling and control of dynamical systems is lectured.In particular, physical modeling of various processes is explained and identification method is also explained by means of experiment data and information technique when physical modeling is impossible. Then, analysis of systems is lectured concerning state vector equation, solution, controllability , observability, staility and realization. Furthermore, modern control thory such as optimal control and state estimation
is explained. Finally, robust control of H-infinity is lectured.

Contents of class

1st week : 1.Physical Modeling
(1)Process system
(2)Mechanical system
(3) Electric system
2nd: 2.System Identification of Linear Systems
(1) Curve fitting method
(2)Time series model such as ARMA model and ARX model
by Least square method
3rd: 3. System Analysis
(1)State space analysis and state variable diffrential equation
4th: (2)Controllability and Observability
5th: (3)Stability
6th: (4)Realizaion

7th: 4.Modern control theory
(1)Optimal regulater(LQ control)
8th: (2)LQI control
9th: (3)Observer
(4)Disturbance observer
10th: (5)Kalman filter
11th: (6)LTR

12th: 5.Robust control
(1)Model uncertainty
13th-15th:
(2)H-infinity robust control

1st week : 1.Physical Modeling
(1)Process system
(2)Mechanical system
(3) Electric system

2nd: 2.System Identification of Linear Systems
 (1) Curve fitting method
(2)Time series model such as ARMA model and ARX model
 by Least square method
3rd: 3. System Analysis
(1)State space analysis and state variable diffrential equation
4th: (2)Controllability and Observability
5th: (3)Stability
6th: (4)Realizaion

7th: 4.Modern control theory
(1)Optimal regulater(LQ control)
8th: (2)LQI control
9th: (3)Observer
(4)Disturbance observer
10th: (5)Kalman filter
11th: (6)LTR

12th: 5.Robust control
(1)Model uncertainty
13th-15th:
(2)H-infinity robust control

Self Preparation and Review

Please read text book
Please read text book

Related subjects

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

Notes for textbook

I will give a text book in the lesson of the first time.

(Reference)
1.State variable methods in Automatic control; K.Furuta , A.Sano and D.Atherton, Wiley, 1988
2.Robust and Optimal control; Mi-Ching Ching Tsai and D-Wei Gu, Springer

Modern control design with MATLAB and SIMLINK by Ashish Tewari, Wiley
I will give a text book in the lesson of the first time.

(Reference)
1.State variable methods in Automatic control; K.Furuta , A.Sano and D.Atherton, Wiley, 1988
2.Robust and Optimal control; Mi-Ching Ching Tsai and D-Wei Gu, Springer

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

Notes for reference

Goals to be achieved

1)We study and understand how to build the mathmatical model in order to predict and control the natural phenomena and the real processes.
2)We understand analysis of dynamical systems.
3)We understand modern control theory of LQ, LQI and LTR, and estimation theory of observer and Kalman filter.
4)We understand robust control theory of H-infinity.

1)We study and understand how to build the mathmatical model in order to predict and control the natural phenomena and the real processes.
2)We understand analysis of dynamical systems.
3)We understand modern control theory of LQ, LQI and LTR, and estimation theory of observer and Kalman filter.
4)We understand robust control theory of H-infinity.

Evaluation of achievement

Test: 50%, Report 50%

Success:
Grade A: 80-100
Grade B: 65-79
Grade C: 55-64
Failure:
Grade D: 0-54

Test: 50%, Report 50%

Success:
Grade A: 80-100
Grade B: 65-79
Grade C: 55-64
Failure:
Grade D: 0-54

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

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

Reference URL

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

Office hours

Thurs.16:00-18:00

Thurs.16:00-18:00

Relations to attainment objectives of learning and education

Key words

Control, Modern control theory, Regulator, Observer, Kalman filter, LQ, LQI, LTR, Robust control, H-infinity control
Control, Modern control theory, Regulator, Observer, Kalman filter, LQ, LQI, LTR, Robust control, H-infinity control

(M41630380)Robotics[Robotics]

Subject name[English]	Robotics[Robotics]				
Schedule number	M41630380	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Mechanical Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Read the handouts before the lecture.

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra, mechanics and control theory.

Fundamentals of linear algebra, mechanics and control theory.

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

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

Notes for reference

Goals to be achieved

Be able to derive kinematics and dynamics of robotic manipulators.

Be able to design motion controllers for robotic manipulators.

Be able to derive kinematics and dynamics of robotic manipulators.

Be able to design motion controllers for robotic manipulators.

Evaluation of achievement

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

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

Examination

定期試験を実施（対面）

Examination(Face to Face)

Details of examination

Other information

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

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework, presentation and/or report.

Coursework, presentation and/or report.

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Methodology of R & D 1[Methodology of R & D 1]				
Schedule number	M42630100	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Coursework and presentation are evaluated generally.

Coursework and presentation are evaluated generally.

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(M42630120)Material Science for Electronics 1[Material Science for Electronics 1]

Subject name[English]	Material Science for Electronics 1[Material Science for Electronics 1]				
Schedule number	M42630120	**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	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	福田 光男, 中村 雄一, 武藤 浩行 FUKUDA Mitsuo, NAKAMURA Yuichi, MUTO Hiroyuki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Lecture materials will be distributed.

Lecture materials will be distributed.

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

(M42630160)Electrical Energy Systems 1[Electrical Energy Systems 1]

Subject name[English]	Electrical Energy Systems 1[Electrical Energy Systems 1]				
Schedule number	M42630160	**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	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
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
3. Fuel Cells

Sub Course 3
1. Generation and control of discharge plasma
2. Characteristics and diagnostics of discharge plasma
3. Basic 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
3. Fuel Cells

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

定期試験を実施(対面)

Examination(Face to Face)

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

(M42630200)Semiconductor Physics 1[Semiconductor Physics 1]

Subject name[English]	Semiconductor Physics 1[Semiconductor Physics 1]				
Schedule number	M42630200	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	若原 昭浩, SANDHU ADARSHWAKAHARA Akihiro, Sandhu Adarsh				
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
Lecture notes and handouts will be distributed

Lecture notes and handouts will be distributed

Reference1	**Book title**	Physics of Semiconducotr Devices			**ISBN**	0471143235
	Author	Simon M. Sze and Kwok K. Ng	**Publisher**	Wiley-Interscience	**Publish year**	2006

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

Details of examination

Other information

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

(M42630260)Advanced Electronic Information System 1[Advanced Electronic Information System 1]

Subject name[English]	Advanced Electronic Information System 1[Advanced Electronic Information System 1]				
Schedule number	M42630260	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	市川 周一, 田村 昌也 ICHIKAWA Shuichi, TAMURA Masaya				
Numbering					

Objectives of class

The aims of this lecture:
(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand the role and design of microwave filter used in wireless communications.

The aims of this lecture:
(1) To understand various hardware algorithms for computer arithmetic,
(2) To understand the role and design of microwave filter used in wireless communications.

Contents of class

This lecture consists of two themes shown below.

(1) 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: Algorithms for multiplication
Week 6,7: Algorithms for division
Week 8: Examination

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

1. Introduction of microwave filter used in wireless communications
2. Image method and network synthesis method for filter design
3. Design of prototype filter and its Mapping
4. Inverter design
5. Resonator design
6. Coupled line design
7. Q factor and its evaluation
8. Examination

This lecture consists of two themes shown below.

(1) 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: Algorithms for multiplication
Week 6,7: Algorithms for division
Week 8: Examination

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

1. Introduction of microwave filter used in wireless communications
2. Image method and network synthesis method for filter design
3. Design of prototype filter and its Mapping
4. Inverter design
5. Resonator design
6. Coupled line design
7. Q factor and its evaluation
8. Examination

Self Preparation and Review

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

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

Notes for reference

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

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

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

Details of examination
TBD
TBD

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

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

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Seminar on Computer Science and Engineering I[Seminar on Computer Science and Engineering I]				
Schedule number	M43610010	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

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

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor for them.

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Computer Science and Engineering[Thesis Research on Computer Science and Engineering]				
Schedule number	M4361003T	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering					

Objectives of class

The project is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.
It is also aimed for students to acquire design ability for their thesis research such as the purpose, the background knowledge, the research topic, the plan/schedule and to present the progress.

The project is intended for students to foster their interests in research problems on computer science and engineering and to acquire ability for independent studies.
It is also aimed for students to acquire design ability for their thesis research such as the purpose, the background knowledge, the research topic, the plan/schedule and to present the progress.

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

To acquire design abilities for doing research and development at technically high level and leading large scale research projects

To acquire design abilities for doing research and development at technically high level and leading large scale research projects

Evaluation of achievement

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

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

Examination 試験期間中には何も行わない None during exam period
Details of examination
Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education
Key words

(M4361004T)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	M4361004T	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Consult with your advisor.

Notes for textbook

Consult with your advisor.
Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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.
Handouts will be prepared.

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

Notes for reference

Goals to be achieved

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

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

レポートで実施

By Report

Details of examination

Other information

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

Room C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)

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

Room C-507, Ext. 6760, Email: sugaya@iim.cs.tut.ac.jp (Yasuyuki Sugaya)

Reference URL

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

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

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

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

Office hours

Relations to attainment objectives of learning and education

Key words

image processing, computer vision

image processing, computer vision

(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	Computer Science and Engineering			**Beggining grade**	M1, M2
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

No textbook is used.

No textbook is used.

Notes for reference

Goals to be achieved

Acquire knowledge on advanced computer science and engineering

Acquire knowledge on advanced computer science and engineering

Evaluation of achievement

Presentation:50%

assignment (report): 50%

Presentation:50%

assignment (report): 50%

Examination

レポートで実施

By Report

Details of examination

Other information

F503, masuyama@tut.jp

F503, masuyama@tut.jp

Reference URL

Office hours

Please make an appointment in advance by e-mail.

Please make an appointment in advance by e-mail.

Relations to attainment objectives of learning and education

Key words
computer science
computer science

(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**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	北﨑　充晃, 中内　茂樹 KITAZAKI Michiteru, NAKAUCHI Shigeki				
Numbering					

Objectives of class

The lectures focus 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 the lectures 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.

The lectures focus 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 the lectures 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

Notes for textbook
No textbook is required.
Printed slides or electrical data will be provided.

No textbook is required.
Printed slides or electrical data will be provided.

Reference1	**Book title**	Cognitive Neuroscience (3rd International student edition)			**ISBN**	
	Author	Gazzaniga, Davies, Ivry, and Mangun	**Publisher**	WW Norton & Co	**Publish year**	

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
Presentation and discussion
A (100-80), B (79-65), C (64-55)
Presentation and discussion
A (100-80), B (79-65), C (64-55)

Examination
レポートで実施
By Report

Details of examination

Other information
mich@cs.tut.ac.jp
mich@cs.tut.ac.jp

Reference URL

Office hours
Mon, 1 hour after the lecture
Mon, 1 hour after the lecture

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Robotics and Informatics 1[Advanced Robotics and Informatics 1]				
Schedule number	M43630260	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	三浦 純 MIURA Jun				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Fundamental knowledge of linear algebra and probability theory are useful.

Fundamental knowledge of linear algebra and probability theory are useful.

Notes for textbook

Handouts will be prepared.

(Reference)
– S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2005.

Handouts will be prepared.

(Reference)
– S. Thrun, W. Burgard, D. Fox, Probabilistic Robotics, MIT Press, 2005.

Notes for reference

Goals to be achieved

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Evaluation of achievement

Grade will be determined by the report.

Grade will be determined by the report.

Examination

授業を実施

Regular Class

Details of examination

Other information

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

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

Reference URL

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

ID and password will be given at the class.

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

ID and password will be given at the class.

Office hours

Make an appointment beforehand by email.

Make an appointment beforehand by email.

Relations to attainment objectives of learning and education

Key words

Robotics

Robotics

(M43630290)Web Data Engineering 2[Web Data Engineering 2]

Subject name[English]	Web Data Engineering 2[Web Data Engineering 2]				
Schedule number	M43630290	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	栗山 繁 KURIYAMA Shigeru				
Numbering					

Objectives of class

The information visualization techniques for analyzing massive data will be discussed.
This lecture aims at training participants to obtain practical techniques for implementing a system of Web-services, using widely-used programming API for computer graphics and visualization.
The information visualization techniques for analyzing massive data will be discussed.
This lecture aims at training participants to obtain practical techniques for implementing a system of Web-services, using widely-used programming API for computer graphics and visualization.

Contents of class

This lecture mainly focuses on graphical models and visualization methods for handling multi-variable data, which consists of the 3 topics below:

1. Correlation visualization of multivariate data
2. Relation visualization with hierarchical and network representation
3. Visualization of semantics and time-variation with textual representation

including exercises of developing actual visualization applications.
This lecture mainly focuses on graphical models and visualization methods for handling multi-variable data, which consists of the 3 topics below:

1. Correlation visualization of multivariate data
2. Relation visualization with hierarchical and network representation
3. Visualization of semantics and time-variation with textual representation

including exercises of developing actual visualization applications.

Self Preparation and Review

All participants should study by themselves about Processing (https://www.processing.org).
All participants should study by themselves about Processing (https://www.processing.org).

Related subjects

Web Data Engineering 1
Web Data Engineering 1

Notes for textbook

Materials will be prepared by lecturers as a Web document.

Materials will be prepared by lecturers as a Web document.

Reference1	**Book title**	Information Visualization: Perception for Design			**ISBN**	978-0123814647
	Author	Colin Ware	**Publisher**	Morgan Kaufmann	**Publish year**	2012

Notes for reference

Goals to be achieved

Obtain the capabilities that implement visualization tools for massive multi-variable data according to the design methodology related to the domain and features of the data.
Obtain the capabilities that implement visualization tools for massive multi-variable data according to the design methodology related to the domain and features of the data.

Evaluation of achievement

Exercise & presentation (100%)
Exercise & presentation (100%)

Examination

レポートで実施
By Report

Details of examination

Other information

Kuriyama,Shigeru(C-504)sk@tut.jp
Kuriyama,Shigeru(C-504)sk@tut.jp

Reference URL

https://moodle2.imc.tut.ac.jp/course/view.php?id=159
https://moodle2.imc.tut.ac.jp/course/view.php?id=159

Office hours

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

Relations to attainment objectives of learning and education

Capability of designing Web application systems.

Capability of designing Web application systems.

Key words

Information Visualization, Visual Data Mining, Computer Graphics, Massive Data Analysis
Information Visualization, Visual Data Mining, Computer Graphics, Massive Data Analysis

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

Subject name[English]	Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics 1]				
Schedule number	M43630300	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	村越 一支 MURAKOSHI Kazushi				
Numbering					

Objectives of class

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook
Handouts are distributed.

Handouts are distributed.

Notes for reference

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

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

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

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

Details of examination

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

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

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

Office hours
After this class
After this class

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

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

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

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

Notes for reference

Goals to be achieved

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

Examination
レポートで実施
By Report

Details of examination

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

Reference URL

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

Relations to attainment objectives of learning and education

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

Details of examination

Other information

Supervisor
Supervisor

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

その他
None during exam period

Details of examination

Other information

Supervisor

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor(s)
Supervisor(s)

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words

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

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

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

Objectives of class

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

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

Contents of class

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

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

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

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

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

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Separation Chemistry I[Advanced Separation Chemistry I]				
Schedule number	M44630010	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	齊戸　美弘 SAITO Yoshihiro				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Separation Chemistry II.

Advanced Separation Chemistry II.

Notes for textbook

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

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

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

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

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

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Advanced Separation Chemistry II[Advanced Separation Chemistry II]				
Schedule number	M44630020	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	平田　幸夫 HIRATA Yukio				
Numbering					

Objectives of class

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

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

Contents of class

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

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

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook

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

Textbook

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

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

Notes for reference

Goals to be achieved

To undersatnd the principle of chromatography.

To undersatnd the principle of chromatography.

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

Office hours

As needed.

As needed.

Relations to attainment objectives of learning and education

Key words

(M44630070)Advanced Polymer Chemistry[Advanced Polymer Chemistry]

Subject name[English]	Advanced Polymer Chemistry[Advanced Polymer Chemistry]				
Schedule number	M44630070	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	伊津野 真一, 原口 直樹 ITSUNO Shinichi, HARAGUCHI Naoki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Organic Chemistry
Polymer chemistry
Organic Chemistry
Polymer chemistry

Notes for textbook

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

Notes for reference

Goals to be achieved

1)To understand radical polymerization of vinyl monomers

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

Evaluation of achievement

The report on selected topics will be imposed.

The report on selected topics will be imposed.

Examination

レポートで実施
By Report

Details of examination

Other information

Ｂ－５０２
6813
itsuno@ens.tut.ac.jp

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**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	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

An examination and term-end report

An examination and term-end report

Examination

定期試験を実施（対面）

Examination(Face to Face)

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

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	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	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	田中 照通, 梅影 創 TANAKA Terumichi, UMEKAGE So				
Numbering					

Objectives of class

This course will provide students with the opportunity to read 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 used in the Class are important papers from that current molecular life science were originated. The students will be required to read, summarize and present two or more research papers.
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 used in the Class are important papers from that current molecular life science were originated. The students will be required to read, summarize and present two or more research papers.

Contents of class

This Class goes with the "Original Papers" of the "Nobel Prize Laureates".
At first, students must access the HP of Nobel Prize Organization: http://nobelprize.org//
Next, choose two "Nobel Prize Awards" after 1970 in the field of "Physiology and Medicine" or "Chemistry", and Get and Read carefully "original papers" of the Laureates. ("Nobel Prize Awards" must be strongly related to biology if you choose from "Chemistry")

After that, every student will have presentation for the chosen "Award".
In the presentation, student must explain plainly the background of the research, the content of the research, and the effects of the research.

Note: Each of two teachers will have the Class, eg. Dr. Tanaka will have the Class in 2014, and Dr. Umekage will have in 2015.
This Class goes with the "Original Papers" of the "Nobel Prize Laureates".
At first, students must access the HP of Nobel Prize Organization: http://nobelprize.org//
Next, choose two "Nobel Prize Awards" after 1970 in the field of "Physiology and Medicine" or "Chemistry", and Get and Read carefully "original papers" of the Laureates. ("Nobel Prize Awards" must be strongly related to biology if you choose from "Chemistry")

After that, every student will have presentation for the chosen "Award".
In the presentation, student must explain plainly the background of the research, the content of the research, and the effects of the research.

Note: Each of two teachers will have the Class, eg. Dr. Tanaka will have the Class in 2014, and Dr. Umekage will have in 2015.

Self Preparation and Review

Process:
(1) Visit the HP of "Nobel Prize" Organization. http://nobelprize.org/

(2) Choose two "Nobel Prize Awards" in the List described below, (Limited from "Chemistry" and " Physiology or Medicine") and Get and Read carefully "original papers" of the Laureates.
(the information of Original Paper(s) may appear in the HP or not.
So you have to Find the Original Paper(s) which is/are strongly related with the Award.)
*Note:
You cannot choose the "Award" which was already chosen by other Student.

(3) Send me e-mail(s) which “Awards” you have chosen. (deadline will be informed in advance)
in the e-mail, you have to describe:
(i) your name, (ii) your student ID,
(iii) the name of Laboratory to which you belong,
(iv) the year of each Award which you have chosen, (for two “Awards”)
(v) all name(s) of Laureates of the Award, and
(vi) information of the Original papers of the Laureates (journal name, year, volume, pages, authors’ name, and title)

(4) Make a presentation to the Audience (Students and me) for each “Award”.

Process:
(1) Visit the HP of “Nobel Prize” Organization. http://nobelprize.org/

(2) Choose two “Nobel Prize Awards” in the List described below, (Limited from “Chemistry” and “ Physiology or Medicine”)
and Get and Read carefully “original papers” of the Laureates.
(the information of Original Paper(s) may appear in the HP or not.
So you have to Find the Original Paper(s) which is/are strongly related with the Award.)
*Note:
You cannot choose the “Award” which was already chosen by other Student.

(3) Send me e-mail(s) which “Awards” you have chosen. (deadline will be informed in advance)
in the e-mail, you have to describe:
(i) your name, (ii) your student ID,
(iii) the name of Laboratory to which you belong,
(iv) the year of each Award which you have chosen, (for two “Awards”)
(v) all name(s) of Laureates of the Award, and
(vi) information of the Original papers of the Laureates (journal name, year, volume, pages, authors’ name, and title)

(4) Make a presentation to the Audience (Students and me) for each “Award”.

Related subjects
Advanced Applied Biochemistry and Biotechnology
Advanced Applied Biochemistry and Biotechnology

Notes for textbook
see the HP of “Nobel Prize” Organization: http://nobelprize.org/
you can get the (list of) Original Papers in the Web site.
see the HP of “Nobel Prize” Organization: http://nobelprize.org/
you can get the (list of) Original Papers in the Web site.

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
試験期間中には何も行わない
None during exam period

Details of examination

Other information
Terumichi TANAKA: Room: G-506, Phone: 6920, E-mail: terumichi-tanaka@tut.jp

Terumichi TANAKA: Room: G-506, Phone: 6920, E-mail: terumichi-tanaka@tut.jp

Reference URL
none
none

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, gene
Molecular Biology, RNA, DNA, gene

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

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

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

Notes for textbook

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

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

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

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

Reference URL

Office hours

Please make an appointment.
Please make an appointment.

Relations to attainment objectives of learning and education

Key words

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

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

Subject name[English]	Advanced Life Science and Biotechnology I[Advanced Life Science and Biotechnology I]				
Schedule number	M44630210	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Life Science and Biotechnology II
Advanced Life Science and Biotechnology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on life science and biotechnology
To be able to report and discuss the contents of textbooks and papers he/she has read.

To acquire advanced knowledge on life science and biotechnology
To be able to report and discuss the contents of textbooks and papers he/she has read.

Evaluation of achievement

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

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Advanced Environmental Technology I[Advanced Environmental Technology I]				
Schedule number	M44630230	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Advanced Environmental Technology II

Advanced Environmental Technology II

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on environmental science and technology

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

To acquire advanced knowledge on environmental science and technology

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

Key words

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

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

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

Subject name[English]	Advanced Environmental and Ecological Systems I[Advanced Environmental and Ecological Systems I]				
Schedule number	M44630250	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Environmental and Life Sciences			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

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

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

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

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

Evaluation of achievement

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

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

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Supervisor

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

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

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

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

Objectives of class

The 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 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".

Contents of class

I. What is catalysis?
The reactive interface

II. What is catalyst?
Catalytic materials and their preparation
Catalytic activity and selectivity
Measurement of catalytic properties

III. Catalysis for benefit of humans
Raw materials and their conversion
Catalysis for environmental protection
Catalysis in everyday life
Catalysis for the future

I. What is catalysis?
The reactive interface

II. What is catalyst?
Catalytic materials and their preparation
Catalytic activity and selectivity
Measurement of catalytic properties

III. Catalysis for benefit of humans
Raw materials and their conversion
Catalysis for environmental protection
Catalysis in everyday life
Catalysis for the future

Self Preparation and Review

Related subjects

Basic knowledges of physical chemistry and inorganic chemistry are required.

Basic knowledges of physical chemistry and inorganic chemistry are required.

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 heterogeneous catalysis and catalyst
To understand basics of heterogeneous catalysis and catalyst

Evaluation of achievement

30% Homework report, 70% Final examination or report
30% Homework report, 70% Final examination or report

Examination

その他
Other

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**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

TBD by the laboratory

TBD by the laboratory

Notes for textbook

TBD by the laboratory

TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

Details of examination

Other information

Refer to administration office.

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class
Research on architecture and civil engineering

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

Self Preparation and Review

Related subjects
It depends on the laboratory

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
Evaluation is based on report.

Examination
その他
By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Examination

レポートで実施

By Report

Details of examination

Other information

Refer to administration office.

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

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

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

(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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
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

レポートで実施
By Report

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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
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 concept of analytical method for flow problems in geotechnical analysis.
Understanding the basic concept of analytical method for 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

レポートで実施
By Report

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, Earthquake, Geologic Hazards, Numerical Analysis
Disaster, Earthquake, Geologic Hazards, Numerical Analysis

(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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
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

レポートで実施

By Report

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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
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 findings 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 findings 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 investment in risky but promising projects, 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 investment in risky but promising projects, 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.
Strategic response to competitors 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.
Strategic response to competitors is also needed for survival.

Evaluation of achievement

Scoring is based on the semester report (50%) and the business proposal by power point (50%) in terms of (1) originality, (2) academic contribution, and (3) practical usefulness.

Scoring is based on the semester report (50%) and the business proposal by power point (50%) in terms of (1) originality, (2) academic contribution, and (3) practical usefulness.

Examination

レポートで実施
By Report

Details of examination

Other information

Office#: B-313, Phone#: 6946, e-mail: fujiwara@las.tut.ac.jp
Office#: B-313, Phone#: 6946, e-mail: fujiwara@las.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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering					

Objectives of class

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

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

Contents of class

Self Preparation and Review

Related subjects

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Goals to be achieved

Evaluation of achievement

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

Objectives of class

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

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Contents of class

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Goals to be achieved

Evaluation of achievement

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Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

Key words

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

Objectives of class

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

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Contents of class

Self Preparation and Review

Related subjects

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Notes for reference

Goals to be achieved

Evaluation of achievement

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By Report

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	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	齊藤　大樹 SAITOH Taiki				
Numbering					

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

None

None

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

http://www.rc.ace.tut.ac.jp/saito/index-e.html http://www.rc.ace.tut.ac.jp/saito/index-e.html
Office hours
Relations to attainment objectives of learning and education
Key words