Syllabus

International Master′s Degree Program

（2018-Fall Term）

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

Subject name[English]	Culture and Communication I[Culture and Communication I]				
Schedule number	M40030030	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	池松 峰男 IKEMATSU Mineo				
Numbering	GEN_LIB52325				

Objectives of class

After completing the course, students would be anticipated to be aware of language learning, motivation and beliefs with regard to foreign language teaching in Japan.

Contents of class

Week 1 Introduction
Week 2 Grouping and Topic Assignment
Week 3 Topic 1: Language Acquisition – Universal Grammar (UG) –
Week 4 Presentation and Discussion
Week 5 Topic 2: Language Acquisition – Critical Period Hypothesis (CPH)–
Week 6 Presentation and Discussion
Week 7 Topic 3: Thought – Role of Language –
Week 8 Presentation and Discussion
Week 9 Wrap-up
Week 10 Topic 4: L1 vs. Ln – Meaning of Ln Learning –
Week 11 Presentation and Discussion
Week 12 Topic 5: Motivation – Class Work Applicability –
Week 13 Presentation and Discussion
Week 14 Topic 6: Beliefs – On Ln Learning –
Week 15 Presentation and Discussion

Self Preparation and Review

Download and use the materials up on a cloud drive for discussion. Details will be given at the beginning of the course.

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

1. To gain an insight into language acquisition and learning.
2. To discuss foreign language learning in Japan.
3. To understand the importance of non-cognitive skills.

Evaluation of achievement

Coursework 50% (Report 20%, Presentation 30%), Class Contribution 50%

S: 100 – 90
A: 89 – 80
B: 79 – 70
C: 69 – 60
D: 59 – 0

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information
Reference URL
Office hours Drop-in basis.
Relations to attainment objectives of learning and education 電気・電子情報工学専攻 （A）幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえ，自然と人間との共生，人類の幸福・健康・福祉について考える能力
Key words

(M40030090)Principles of Japanese Grammar[Principles of Japanese Grammar]

Subject name[English]	Principles of Japanese Grammar[Principles of Japanese Grammar]				
Schedule number	M40030090	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	吉村　弓子 YOSHIMURA Yumiko				
Numbering	GEN_LIB51425				

Objectives of class

This course aims to provide an opportunity to understand an overview of elementary Japanese grammar for the very beginners. In order to concentrate on grammar, students will not learn Japanese letters and conversation. The course will be taught in English, and progress rapidly.

Contents of class

01 (10/04) Introduction to the course and general features of Japanese

02 (10/11) Pronunciation, Lesson 1: Copula, Particle "wa" [topic], and Declarative, negative, and interrogative sentence

03 (10/18) Lesson 2 and 3: Demonstratives and Particle "no" [possession]

04 (10/25) Lesson 4 and 5: Verbs, Tense (non-past and past), Particle "ni" [time], "kara [start], "made" [goal], "e" [direction], "de" [transportation], and "to" [cooperation]

05 (11/01) Lesson 6 and 7; Particle "o" [object], "de" [place][means], "ni" [goal][source]

06 (11/08) Lesson 8: Adjectives, Lesson 9: Particle "ga"[object]

07 (11/15) Lesson 10: Existence, Lesson 11: Numerals and Counter suffixes

08 (11/29) Lesson 12: Past tense of adjectives, Lesson 13: Adjectives of Desire

09 (12/06) Lesson 14 and 15: Verb groups, "te"-form of verbs, and Sentences using "te"-form

10 (12/13) Lesson 16: Sentences using "te"-form, Lesson 17: "nai"-form of verbs

11 (01/10) Lesson 18: Dictionary form of verbs, Lesson 19: "ta"-form of verbs

12 (01/17) Lesson 20: Polite and plain style, Lesson 21: Indirect speech

13 (01/24) Lesson 22: Noun modification

14 (01/31) Lesson 23: Complex sentence using "toki"[when], Lesson 25: Conditional mood

15 (02/14) Lesson 24: Exchanging things or kindness

16 (02/28) Final exam

Self Preparation and Review

Read the respective parts of the textbook in advance.
Memorize the sentences learned in every class meeting to prepare for the next class's quiz.

Related subjects
"Basic Grammar 1" of non-credit course "Basic Japanese" will cover Exercise A and B of the main textbook.

Textbook1	**Book title**	Minna no Nihongo (Elementary Japanese I, 2nd Edition) Translation & Grammar Notes-English, Romanized Version			**ISBN**	978-4-88319-629-6
	Author		**Publisher**	3A Corporation	**Publish year**	2013

Notes for textbook
Each lesson consists of 1)vocabulary, 2)translation of the main textbook, 3)useful words and information, and 4)grammar notes. 1)Vocabulary and 4)grammar notes only will be taught in the course.

Notes for reference

Goals to be achieved
At the end of this course students will be able
1) to know pronunciation of Japanese language.
2) to understand pronunciation and meaning of elementary Japanese vocabulary.
3) to grasp an overview of elementary Japanese grammar.

Evaluation of achievement
Grading Policy: Quizzes 30%, Final exam 70%

Evaluation Criteria: Students who meet required attendance will be evaluated as follows by the total points (out of 100 points) obtained from what shown above:

M1
S: 90 or higher
A: between 80 and 89
B: between 70 and 79
C: between 60 and 69

M2
A: 80 or higher
B: between 65 and 79
C: between 55 and 64

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

Details of examination

Other information
When you contact by e-mail, write "I am (your name) of Principles of Japanese Grammar" as the subject .

Reference URL

Office hours
Office Hour
Friday 11:00-12:00
By appointment 08:30-12:00, 13:30-16:30 on weekday will be available.

Relations to attainment objectives of learning and education

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

Key words
elementary Japanese, grammar

(M40030100)Japanese Industrial Technologies and Innovations[Japanese Industrial Technologies and Innovations]

Subject name[English]	Japanese Industrial Technologies and Innovations[Japanese Industrial Technologies and Innovations]				
Schedule number	M40030100	**Subject area**	General courses	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	穂積 直裕, 梅村 恭司, 齊藤 大樹, 青野 雅樹, 井上 光輝, 石田 好輝, 高野 靖, 入山 恭彦, 角田 正也, 小林 真一, 松本 雅行, 大和 真樹 HOZUMI Naohiro, UMEMURA Kyoji, SAITOH Taiki, AONO Masaki, INOUE Mitsuteru, ISHIDA Yoshiteru, TAKANO Yasushi, IRIYAMA Takahiko, KAKUTA Masaya, KOBAYASHI Shinichi, MATSUMOTO Masayuki, OHWA Masaki				
Numbering	COM_MAS51025				

Objectives of class

In this series of lectures, the excellent experts of our university and Japanese leading companies from variety of fields in engineering impart to the engineering students knowledge of superior industry technologies in Japan. Students learn advantages and its contributing factors of Japanese industrial technologies.

* International students dispatched by JICA Development Studies Program (JICA-DSP) including ABE, Innovative Asia and PEACE in 2018 should take this subject as a compulsory course.

Contents of class

Each experts deliver lecture on specific industrial technology and its advantage from his reserch field. Some reserchers show difficulties and contributing factors of developing technologies through behind-the-scenes story. Some experts from manufacturing company show signature process how transform"technologies" to "industory or production" in Japanese companies.

1. Masaki Owa : Current Status and Hurdle of Pharmaceutical R&D in Japan
2～4 Taiki Saito : Earthquake and Tsunami Disaster Mitigation Techniques
5. Masaya Kakuta : Industrial technology from a design point of view
6. Masayuki Matsumoto : TBA
7. Yasushi Takano : Environmental noise of Railways
8. Masaki Owa : Innovation in Japanse Chemical Indutry 1 -Polymer Materials
9. Kyoji Umemura : TBA
10. Masaki Aono : An Introduction to Data Science and Deep Learning
11. Takahiko Iriyama : Importance of R&D in manufacturing companies-Case study ;Development of permanent magnets
12. Masaki Owa : Innovation in Japanse Chemical Indutry 2 -Electronic Materials
13. Mitsuteru Inoue : Magnetics and its electronic applications
14. Shinichi Kobayashi : TBA
15. Yoshiteru Ishida : Artificial Intelligence; pecent Trend and Future

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

1) To understand Japanese superior industrial technologies.
2) To concider contributing factors of creativity of industrial technologies in Japan showing specific technologies covered by lectures.
3) To analize advantages of application of science and technology on production process in Japanese manufacturing companies.

Evaluation of achievement

Evaluation method scoring will be processed by sum of each report evaluation
Evaluation criteria:
Students who attend all classes will be evaluated as follows:
S: Achieved all goals and obtained total points of exanm and reports, 90 or high (out of 100 points)
A: Achieved all goals and obtained total points of exanm and reports, 80 or high (out of 100 points)
B: Achieved at least 65% of goals and obtained total points of exanm and reports, 70 or high (out of 100 points)
C: Achieved at least 55% of goals and obtained total points of exanm and reports, 60 or high (out of 100 points)

Examination
レポートで実施
By Report

Details of examination
None during exam period

Other information

Reference URL

Office hours
After each class

Relations to attainment objectives of learning and education

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

Key words
industrial technology, develoment technology, application technology

(M40110020)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	M40110020	**Subject area**	General courses	**Required or elective**	Required
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.1～1	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering, Architecture and Civil Engineering, Electrical and Electronic Information Engineering, Computer Science and Engineering, Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎, 上野　未貴 kyoumu iinkai fukuiintyou, TANAKA Saburo, UENO Miki				
Numbering	COM_MAS51015				

Objectives of class

Assist graduate students as they undertake research activities and promote an understanding of the inherent ethical problems; lead students to think independently and exercise normative consciousness of research ethics through ethics education in research in accordance with goals of scientific education and research and characteristics of individual research specialties.

Contents of class

＊1st week(2018.10.17): Introduction, 1st module("Research Misconduct") in e-learning
＊2nd – 6th week(October 24 – November 21): 2nd – 6th modules in e-learning
– 2nd week: "Ethical Issues in the Management of Data in Engineering Research"
– 3rd week: "Responsible Authorship"
– 4th week: "Ethical Issues in the Peer Review and Publication of Engineering Research" & "Collaborative Research in Engineering Fields"
– 5th week: "Whistleblowing and the Obligation to Protect the Public"
– 6th week: "Managing Public Research Funds"
＊~7th week(November 22 – November 27): Discussion with supervisor
＊8th week(November 28 2018) : make a final report

Self Preparation and Review

Students will need to refer to their textbook to prepare for and review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

Notes for reference

For the Sound Development of Science ?The Attitude of a Conscientious Scientist
Japan Society for the Promotion of Science Editing Committee , MARUZEN PUBLISHING
2015 ISBN978-4-621-08938-5
(PDF:https://www.jsps.go.jp/j-kousei/data/rinri.pdf)

Goals to be achieved

To prevent misconduct and promote fair research activities, this course provides knowledge and techniques regarding research ethics in accordance with characteristics of each graduate student's research specialties.

Evaluation of achievement

[Evaluation method] Final exam(100%)
[Evaluation basis]
Those who take and pass the short test after each unit of e-learning contents will be evaluated with following basis.
S: Obtained total points of exam and reports, 90 or higher (out of 100 points).
A: Obtained total points of exam and reports, 80 or higher (out of 100 points).
B: Obtained total points of exam and reports, 70 or higher (out of 100 points).
C: Obtained total points of exam and reports, 60 or higher (out of 100 points).

Examination

レポートで実施
By Report

Details of examination

By report

Other information
Reference URL
Office hours
Relations to attainment objectives of learning and education 電気・電子情報工学専攻 （A）幅広い人間性と考え方 人間社会を地球的な視点から多面的にとらえ，自然と人間との共生，人類の幸福・健康・福祉について考える能力 （B）技術者としての正しい倫理観と社会性 技術者としての専門的・倫理的責任を自覚し，社会における技術的課題を設定・解決・評価する能力
Key words Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

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

Subject name[English]	Seminar on Mechanical Engineering I[Seminar on Mechanical Engineering I]				
Schedule number	M41610010	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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～
Department Offered	Mechanical Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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**	1～1
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	MEC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

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**	1～1
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	MEC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

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

(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**	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	MEC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Examination

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～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS51015				

Objectives of class

Students are expected to address problems in a specialized field in a company or research institute. The objectives of this subject are to experience practical research and development and to cultivate the practical problem-solving ability, planning ability, and creativity.

Contents of class

In order to cultivate the practical problem-solving ability, academic and company/institutional supervisors will provide practical problems in a specialized field through close communication.

Self Preparation and Review

Studens are expected to discuss a preferable intership topic with supervisors before starting it.

Related subjects

Notes for textbook

Follow instructions provided by company/institutional supervisors.

Notes for reference

Goals to be achieved

While engaging practical activities in a company or research institution for several months, students are expected to improve the practical problem-solving ability, planning ability, and creativity as well as an international way of thinking.

Evaluation of achievement

Comprehensive evaluation based on students' reports and evaluation sheets by academic and company/institutional supervisors.
A: 80 or higher (out of 100 points), B: 65 or higher (out of 100 points) C: 55 or higher (out of 100 points)

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

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

Subject name[English]	Advanced Mechanical Systems Design I[Advanced Mechanical Systems Design I]				
Schedule number	M41630210	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS53025				

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.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS54025				

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.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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**	Wed.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS55025				

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.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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**	Wed.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_MAS56025				

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.

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Textbook or material will be made available from the supervisors.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.

Examination

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～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	飯田　明由 IIDA Akiyoshi				
Numbering	MEC_MAS56025				

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**	Tue.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	森 謙一郎, 足立 忠晴 MORI Ken-Ichiro, ADACHI Tadaharu				
Numbering	MEC_MAS53015				

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.

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 #1
Torsion and bending of thin-walled beams
Chapter 7. Mechanics of Thin-Walled Structures #2
Torsion and bending of thin-walled beams
Chapter 8. Summary

Self Preparation and Review

The knowledge about the strength of materials is required.

Related subjects

Mechanics of Materials, Elasticity, Solid Mechanics

Notes for textbook

Part 1 (Prof. Mori): handout

Text for Part (2) (Prof. Adachi) will be distributed on the web site. The details of the text will be given in the first 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.

Evaluation of achievement

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

M1
S: Achieved 90% of goals or higher (out of 100 points).
A: Achieved 80% of goals or higher (out of 100 points).
B: Achieved 70% of goals or higher (out of 100 points).
C: Achieved 60% of goals or higher (out of 100 points).

M2
A: Achieved 80% of goals or higher (out of 100 points).
B: Achieved 65% of goals or higher (out of 100 points).
C: Achieved 55% of goals or higher (out of 100 points).

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

Reference URL

Part(1) (Prof. Mori) http://plast.me.tut.ac.jp/index.eng.html
Part(2) (Prof. Adachi) http://solid.me.tut.ac.jp/solid/

Office hours

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

(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	Fall term	**Day of the week,period**	Mon.3 ～ 3,Tue.2 ～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	中村　祐二, 飯田　明由 NAKAMURA Yuji, IIDA Akiyoshi				
Numbering	MEC_MAS56025				

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

(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**	Wed.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering	MEC_MAS55025				

Objectives of class

Provides fundamentals of robotics; 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.

Self Preparation and Review

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra, mechanics and control theory.

Notes for textbook

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.

Evaluation of achievement

The grade will be determined only by the intermediate and end-of-term examination scores (100 %).

The credit of this course is given if the score of the above examination is 60% or over.
Grade levels are C (60% – less than 70%), B (70 – less than 80%), A (80 – less than 90%) and S (90% or over).

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

(M41630400)Robot Kinematics[Robot Kinematics]

Subject name[English]	Robot Kinematics[Robot Kinematics]				
Schedule number	M41630400	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	内山　直樹 UCHIYAMA Naoki				
Numbering	MEC_MAS55025				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Read the handouts before the lecture.

Related subjects

Fundamentals of linear algebra and mechanics.

Notes for textbook

Handouts will be prepared.

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

Notes for reference

Goals to be achieved

Be able to derive kinematics of robotic manipulators.

Evaluation of achievement

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

The grade will be determined only by the end-of-term examination score (100 %).

The credit of this course is given if the score of the above examination is 60% or over.
Grade levels are C (60% – less than 70%), B (70 – less than 80%), A (80 – less than 90%) and S (90% or over).

Other information

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

Reference URL

Office hours

Contact the lecturer by e-mail first.

Relations to attainment objectives of learning and education

Key words

(M41630410)Computational Mechanics[Computational Mechanics]

Subject name[English]	Computational Mechanics[Computational Mechanics]				
Schedule number	M41630410	**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～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	森　謙一郎 MORI Ken-Ichiro				
Numbering	MEC_MAS53025				

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.

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

Self Preparation and Review

solid mechanics

Related subjects

Strength of material, Solid mechanics, Numerical methods

Notes for textbook

Handout

Notes for reference

Goals to be achieved

To understand the finite element method

Evaluation of achievement

Reports of every week

Examination

その他
Other

Details of examination

solid mechanics, calculation using finite element method, numerical methods, etc.

Other information

room number: D-606
extension number: 6707

Reference URL

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

Office hours

Tuesday

Relations to attainment objectives of learning and education

To understand the numerical analysis in solid mechanics

Key words
forming processes, solid mechanics, finite element method

(M41630480)Combustion Theory[Combustion Theory]

Subject name[English]	Combustion Theory[Combustion Theory]				
Schedule number	M41630480	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	中村　祐二 NAKAMURA Yuji				
Numbering	MEC_MAS56025				

Objectives of class

エネルギーの大半を化石燃料の燃焼から得ている．しかし，化石燃料の枯渇，環境問題等の負の側面も抱えている．高効率燃焼技術，低環境負荷技術が求められている．本講義ではその根本である燃焼問題に関する理論的考察を講義する

This coursework offers the advanced approach to understanding the combustion processes and its impact. Students can learn the theoretical approach to understand the feature of combustion and gain fundamentals of theoretical aspect on combustion.

Contents of class

#1 Introduction to combustion phenomena
#2 Governing equations and non-dimensionalization
#3 chemical reaction
#4 Ignition
#5 One-dimensional flame theory
#6 Fendell curve
#7 mixture fraction approach
#8 droplet combustion

Self Preparation and Review

Students are expected to complete their homework (if any) and exercise/training on a voluntarily basis to gain deep understanding what was taught in the coursework.

Related subjects

Fluid dynamics, Mass and heat transport, Combustion engineering (related courseworks)

Notes for textbook

Instructors will provide the materials (ppt slide, academic papers) as necessary

Reference1	**Book title**	Fundamental Aspects of Combustion			**ISBN**	0-19-507626-5
	Author	A. Linan and F.A. Williams	**Publisher**	Oxford Press	**Publish year**	1993
Reference2	**Book title**	Combustion Theory			**ISBN**	0-8053-9801-5
	Author	F.A. Williams	**Publisher**	Benjamin-Cummings	**Publish year**	1985
Reference3	**Book title**	Principles of Combustion			**ISBN**	
	Author	K.K.Kuo	**Publisher**	John Wiley & Sons	**Publish year**	2005

Notes for reference

N/A

Goals to be achieved

Learn what is the effective mathematical approach (with proper simplification) to solve combustion problem theoretically.

Evaluation of achievement

Instructors will rate your score via assignments. To qualify the coursework, students must pass 60 point out of 100 and rating is as follows: S (> 90 points), A (> 80 points), B (> 70 points), C (> 60 points)

Examination

授業と定期試験(対面)

Regular Class and Examination(Face to Face)

Details of examination

Report and oral examination will be held (subject to change according to the number of registered students)

Other information

If you have any question, please ask course instructor (Assoc. Prof. Nakamura).

Assoc. Prof. Nakamura: Rm D311, ext. 6647, mail:yuji@me.tut.ac.jp

Reference URL

特になし

N/A

Office hours

Send mail to instructors to book their time first, if you would like to visit to have face-to-face-discussion

Relations to attainment objectives of learning and education

Key words

Combustion, Thermal Engineering, Thermodunamics, Chemical Reaction

(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**	1～1
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering	ELC_MAS51025				

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

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

(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**	1～1
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering	ELC_MAS51025				

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.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members
(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員, 2系各教員 2kei kyomu Iin-S, 2kei kakukyouin				
Numbering	ELC_MAS51025				

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.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical

and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members
(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering[Seminar on Electrical and Electronic Information Engineering]				
Schedule number	M42610040	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members
(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

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

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1A[Seminar on Electrical and Electronic Information Engineering 1A]				
Schedule number	M42610050	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	4
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members
(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

(M42610060)Seminar on Electrical and Electronic Information Engineering 1B[Seminar on Electrical and Electronic Information Engineering 1B]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 1B[Seminar on Electrical and Electronic Information Engineering 1B]				
Schedule number	M42610060	**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)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Coursework, presentation and/or report.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as advanced-level engineers and researchers; have the ability to set, solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; to contribute to the team's achievements through working cooperatively with other members
(E) Inquisitive mind and continuous learning ability for changes in the state-of-the-art technology and in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

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

Subject name[English]	Methodology of R & D 1[Methodology of R & D 1]				
Schedule number	M42630100	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.3～3	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_MAS58025				

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.

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

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 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.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69

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

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive

knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

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～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	福田 光男, 内田 裕久, 中村 雄一 FUKUDA Mitsuo, UCHIDA Hironaga, NAKAMURA Yuichi				
Numbering	ELC_MAS52025				

Objectives of class

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

Contents of class

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

2.Spin electronics.
You will learn about advanced magnetic materials and area from fundamentals to applications of magnetics.
1) Magnetic materials, 2) Applications of magnetics and magnetic materials, 3) Correlations between spins and various physical quantities, 4) Micro-magnetic devices and systems, 5) Spintronics and spin photonics.

3. 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.

Self Preparation and Review

Related subjects

Notes for textbook

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.

Evaluation of achievement

The reports or tests will be set in each categories.
The result is evaluated from the sum of those marks.
Grades: S: 90-100, A:80-89, B:70-79, C:60-69.

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

Please make an appointment via e-mail.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

Key words

photonics, spin electronics, powder processing, thermelectronics

(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.4～4	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	滝川 浩史, 櫻井 庸司, 穂積 直裕 TAKIKAWA Hirofumi, SAKURAI Yoji, HOZUMI Naohiro				
Numbering	ELC_MAS53025				

Objectives of class

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

Contents of class

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

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

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

Self Preparation and Review

Related subjects

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

Notes for textbook

Materials will be prepared by the lecturers.

Notes for reference

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

Goals to be achieved

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

Evaluation of achievement

Examination

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Office:
H. Takikawa: C-311, TEL: 0532-44-6727, E-mail: takikawa@ee.tut.jp
Y. Sakurai: C-305, TEL: 0532-44-6722, E-mail: sakurai@ee.tut.jp
N. Hozumi: C-309, TEL: 0532-44-6758, E-mail: hozumi@ee.tut.jp

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

Key words

Electric Energy, Electric Power, High Voltage, Secondary Battery, 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**	Mon.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	若原 昭浩, 岡田 浩, 河野 剛士 WAKAHARA Akihiro, OKADA Hiroshi, KAWANO Takeshi				
Numbering	ELC_MAS54025				

Objectives of class

先端的な半導体デバイスのための理論、デバイス構造、設計や作製プロセスを理解することを目標とする。
To understand semiconductor physics, structure, design, and processing of advanced semiconductor devices.

Contents of class

この科目は前半と後半の2つの部分から構成される。前半では pn 接合や MOS 構造における多数および少数キャリアの振る舞いについて扱う。注入された少数キャリアのダイナミクスについても触れる。後半では学生が以下から1つのトピックスを選択する。

1. ナノ構造デバイスの作製および評価技術(岡田)
2. バンドエンジニアリングと量子効果デバイス(若原)
3. 先端 MEMS/NEMS 技術(河野)

講義に加えて学生が主体的に取り組むケーススタディも実施する。学生は与えられた課題についての調査研究や、要求を満足するデバイスを設計するなどの課題に取り組み、プレゼンテーションを行う。
This subject consists of two parts. The first half begins by introducing majority- and minority-carrier behavior in fundamental pn-junction and MOS structures. Injected minority carrier dynamics in semiconductors is also included. On the latter half, student choose one from following three topics.

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

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

Self Preparation and Review

Related subjects

solid-state physics, basic of semiconductor physics, quantum mechanics, thermodynamics, and electronics

Master's course: Semiconductor physics 2
solid-state physics, basic of semiconductor physics, quantum mechanics, thermodynamics, and electronics

Semiconductor Physics2, Master course

Notes for textbook

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

関連する参考文献やデータ、資料などは講義で配布する。
S.M.Sze, Physics of Semiconductor Devices (Wiley)

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

Notes for reference

Goals to be achieved

1. 半導体における基本的な物理現象を深く理解し、学部生にその内容を解説できること
2. 基本的な半導体デバイスの動作原理を学部生に解説できること
3. 与えられた要求仕様を満足する半導体デバイスの基本部分を設計することができること
4. 与えられたトピックスを調査し、解説できること

You will be able to:

1. Deeply understand fundamental phenomena in semiconductors, and make an interpretation of it to undergraduate students.
2. Explain operation principle of basic semiconductor devices to undergraduate students.
3. Design a essential part of semiconductor device that satisfies the given specification.
4. Investigate on given topics, and give a lecture on this.

Evaluation of achievement

ケーススタディ発表(50%)および研究調査レポート(50%)で評価する。
S:ケーススタディの解説・レポートの合計点(100 点満点)が 90 点以上
A:ケーススタディの解説・レポートの合計点(100 点満点)が 80 点以上
B:ケーススタディの解説・レポートの合計点(100 点満点)が 70 点以上
C:ケーススタディの解説・レポートの合計点(100 点満点)が 60 点以上
Achievement of presentation of the case study(50%), and writing research reports(50%).
S:Total score is over 90/100
A:Total score is over 80/100
B:Total score is over 70/100
C:Total score is over 60/100

Examination

その他
Other

Details of examination

評価方法については講義の中で指示する。
Qualification will be directed in the class.

Other information

履修要件などを指導教員と相談の上,予め下記の教員にコンタクトすること。

若原昭浩:C-608 wakahara[at]ee.tut.ac.jp
岡田浩:B-304 okada[at]las.tut.ac.jp
河野剛士:C-603 kawano[at]ee.tut.ac.jp
Before choosing this class, get advice of your supervisor(s), and then contact to following professors.

Akihiro Wakahara:C-608 wakahara[at]ee.tut.ac.jp
Hiroshi Okada:B-304 okada[at]las.tut.ac.jp
Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp

Reference URL

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

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

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

(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.1～1	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	市川 周一, 田村 昌也 ICHIKAWA Shuichi, TAMURA Masaya				
Numbering	ELC_MAS55025				

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.

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

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

Notes for textbook

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.

Evaluation of achievement

Item (1) 50%, Item (2) 50%.

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

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

Reference URL

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.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about electrical and electronic information engineering as well as related fields; have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about electrical and electronic information engineering as well as related fields; to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about electrical and electronic information engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

Key words

(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～
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	CMP_MAS51015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

教員が指定する内容に関し、予習・復習を行う。

Consult with your advisor.

Related subjects

指導教員に問い合わせること。

Consult with your advisor.

Notes for textbook

指導教員に問い合わせること。

Consult with your advisor.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。

(2)技術的な情報を扱う英文が解釈でき、作文できる。

(3)論文の標準的な構成ができる。

(4)発表というスタイルでの情報提供ができる。

(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.

(2) To interpret technical information written in English, and to write such information in English.

(3) To make a standard construction of a technical paper.

(4) To provide information by oral presentation.

(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、技術情報の理解度、説明の方法、質問への回答、議論への参加の様子等から総合的に指導教員が判定する。

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

課題レポートやプレゼンテーションに基づいて評価する。
Your supervisor will evaluate your presentation and your reports.

Other information

Reference URL

Office hours

指導教員に問い合わせること。
Consult with your advisor.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

Key words

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

Subject name[English]	Seminar on Computer Science and Engineering II[Seminar on Computer Science and Engineering II]				
Schedule number	M43610020	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering	CMP_MAS61015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

教員が指定する内容に関し、予習・復習を行う。

Consult with your advisor.

Related subjects

指導教員に問い合わせること。

Consult with your advisor.

Notes for textbook

授業にて指定する。

Consult with your advisor.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。

(2)技術的な情報を扱う英文が解釈でき、作文できる。

(3)論文の標準的な構成ができる。

(4)発表というスタイルでの情報提供ができる。

(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.

(2) To interpret technical information written in English, and to write such information in English.

(3) To make a standard construction of a technical paper.

(4) To provide information by oral presentation.

(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、技術情報の理解度、説明の方法、質問への回答、議論への参加の様子等から総合的に指導教員が判定する。

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
試験期間中には何も行わない
Non during exam period

Other information
指導教員に問い合わせること。
Consult with your advisor.

Reference URL

Office hours
指導教員に問い合わせること。
Consult with your advisor.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

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**	1～1
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員，3系各教員，S3系教務委員－23kei kyomu Iin-S, 3kei kakukyouin, 3kei kyomu Iin-S2				
Numbering	CMP_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Consult with your advisor for them.

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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**	1～1
Department Offered	Computer Science and Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S3系教務委員, 3系各教員 3kei kyomu Iin-S, 3kei kakukyouin				
Numbering	CMP_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Consult with your advisor for them.

Related subjects

Consult with your advisor for them.

Notes for textbook

Consult with your advisor for them.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

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**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員, 3系各教員 3kei kyomu Iin-S, 3kei kakukyouin				
Numbering	CMP_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

Goals to be achieved

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

Evaluation of achievement

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

Examination

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

(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad

through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team members; and to contribute to the team's achievements through working cooperatively with other team members

Key words

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

Subject name[English]	Seminar on Computer Science and Engineering[Seminar on Computer Science and Engineering]				
Schedule number	M43610040	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering	CMP_MAS61015				

Objectives of class

各研究室が指定する情報学に関する最先端の技術情報(特に英語による最先端の技術情報)を発見する能力、ならびに、その技術情報を理解、説明、質疑・応答できる能力を養う。

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

教員が指定する最先端の技術情報(特に英語による最先端の技術情報)について理解したところを説明する。

教員は技術情報の内容の発見、理解、説明、質疑・応答する方法について直接指導を行う。

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

教員が指定する内容に関し、予習・復習を行う。

Consult with your advisor.

Related subjects

指導教員に問い合わせること。

Consult with your advisor.

Notes for textbook

指導教員に問い合わせること。

Consult with your advisor.

Notes for reference

Goals to be achieved

(1)最先端の専門分野の英文が理解でき、わかりやすく説明できる。

(2)技術的な情報を扱う英文が解釈でき、作文できる。

(3)論文の標準的な構成ができる。

(4)発表というスタイルでの情報提供ができる。

(5)情報の不足を質問という形式で指摘できる。

(1) To understand English literature on state-of-the-art areas of expertise, and to explain clearly.

(2) To interpret technical information written in English, and to write such information in English.

(3) To make a standard construction of a technical paper.

(4) To provide information by oral presentation.

(5) To point out the lack of information by questions.

Evaluation of achievement

技術情報の発見に向けた自主性、技術情報の理解度、説明の方法、質問への回答、議論への参加の様子等から総合的に指導教員が判定する。

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

課題レポートやプレゼンテーションに基づいて評価する。
Your supervisor will evaluate your presentation and your reports.

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about computer science and engineering as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems

Key words

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

Subject name[English]	Advanced Topics in Brain and Cognitive Sciences[Advanced Topics in Brain and Cognitive Sciences]				
Schedule number	M43630200	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	北﨑 充晃, 中内 茂樹 KITAZAKI Michiteru, NAKAUCHI Shigeki				
Numbering	CMP_MAS53025				

Objectives of class

To understand brain and neural system functioning underlying the excellence of human information processing such as perception, learning, and memory. To learn methods of measurement based on engineering approaches and data analysis. To understand what is "human" based on deep insights gained from the study.

Contents of class

The current findings on the excellence of human information processing in perception, learning, and memory are explained and methodologies are introduced to investigate the brain using a new approach combining physiology and engineering to realize technological applications. The lectures include various demonstrations and discussions about the latest findings on neural activities and perceptual phenomena.

Lecture Schedule:
1. Introduction
2. Questions and research methodology
3-4. Sensation and psychophysics
5-6. Basics in perception
7-8. Depth perception
9-10. Motion perception
11. Mid-level vision (surface and objects)
12. High-level vision (Attention and consciousness)
13-14. Virtual reality
15. Discussion

Self Preparation and Review

Read the documents provided before each lecture. Review the lectures in consultation with the references and other resources such as the Internet.

Related subjects

Notes for textbook

Documents (slides) will be provided via web before commencement of the lectures.

Reference1	**Book title**	Cognitive Neuroscience; Fourth International Student edition			**ISBN**	978-0393922288
	Author	Michael S. Gazzaniga	**Publisher**	W. W. Norton & Company	**Publish year**	2008
Reference2	**Book title**	イラストレクチャー認知神経科学			**ISBN**	978-4274208225
	Author	村上郁也 編著	**Publisher**	オーム社	**Publish year**	2010

Notes for reference

Goals to be achieved

To be able to explain the differences between traditional information processing and human information processing
To be able to discuss research concepts based on cognitive neurosciences, which will replace current technologies
To be able to discuss human-machine symbiosis

Evaluation of achievement

Grades will be based on theme reports from each lecture (50%) and the final report (50%)
S: 90 points or higher (out of 100)
A: 80 points or higher (out of 100)
B: 70 points or higher (out of 100)
C: 60 points or higher (out of 100)

Examination

レポートで実施
By Report

Details of examination

Other information

Reference URL

Office hours

Contact by e-mail

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

cognitive neurosciences, perception

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

Subject name[English]	Advanced Robotics and Informatics 1[Advanced Robotics and Informatics 1]				
Schedule number	M43630260	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	三浦 純 MIURA Jun				
Numbering	CMP_MAS53225				

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 particle 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.

Self Preparation and Review

Related subjects

Fundamental knowledge of linear algebra and probability theory is useful.

Notes for textbook

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

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

Notes for reference

Goals to be achieved

Understanding of the fundamentals of sensor fusion strategies and algorithms.

Evaluation of achievement

Th grade will be determined by the final presentation and the report.

Examination

レポートで実施
By Report

Details of examination

Other information

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

Reference URL

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.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

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.5～5	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	栗山 繁 KURIYAMA Shigeru				
Numbering	CMP_MAS52425				

Objectives of class

本講義では、大規模または多次元のデータを効率的かつ効果的に表示する可視化の設計手法を講述し、対象データの性質や特徴を分析しながら可視化機構を自らデザインしてプログラム化する制作実習によって、実践的な応用開発力を習得する。

This class teaches design methodology of developing data exploration tools by efficiently and effectively visualizing huge size or dimension of a dataset. Practical skill of developing visualization tools is learned by the practice of actual programming.

Contents of class

第1週目:情報可視化の導入と概要説明
第2週目:可視化 API とグラフ描画演習
第3週目:相関の可視化(多変量データ)
第4週目:構造の可視化(階層・木構造)
第5週目:関係の可視化(グラフ・ネットワーク)
第6週目:テキストと変動の可視化と対話的操作
第7+0.5 週目:課題制作

Week 1. Introduction and overview of information visualization
Week 2. API for drawing diagram
Week 3. Correlation visualization of multivariate data
Week 4. Relation visualization with hierarchical and network representation
Week 5. Visualization of relation (graph and network)
Week 6. Visualization of textual information and time-variation
Week 7+0.5. An exercise of developing a visualization tool

Self Preparation and Review

予習・復習のために、それまでに講義した内容と翌週の講義内容を Web でのe-ラーニングシステム(Moodle)で公開する。
A digital textbook is freely supplied on e-learning system developed on Moodle.

Related subjects

数値解析, 多変量解析, データマイニング・可視化特論 I
Numerical analysis, Multivariate analysis, Advanced Data Mining and Visualization 1

Notes for textbook

e-ラーニングシステム(Moodle)に公開する電子テキストを使用する.
A digital textbook is supplied on an E-learning system of Moodle.

Notes for reference

Goals to be achieved

大規模、多次元のデータを効率的かつ効果的に可視化するデザイン手法を理解し、与えられたデータの性質を考慮して最適な可視化のプログラムを制作できる技能を習得する
The goal of this class is to teach design methodology of the visualization system for efficiently and effectively visualize the huge size of multi-dimensional datasets.

Evaluation of achievement

中間レポート 20 点, 出席 20 点, および制作課題 60 点の合計 100 点で採点する。
S:達成目標をすべて達成しており, かつ中間レポート, 出席, および制作課題の合計点(100 点満点)が 90 点以上
A:達成目標をすべて達成しており, かつ中間レポート, 出席, および制作課題の合計点(100 点満点)が 80 点以上
B:達成目標を 80%達成しており, かつ中間レポート, 出席, および制作課題の合計点(100 点満点)が 70 点以上
C:達成目標を 60%達成しており, かつ中間レポート, 出席, および制作課題の合計点(100 点満点)が 60 点以上

中間レポート 20 点，出席 20 点，および制作課題 60 点の合計 100 点で採点する。
S:達成目標をすべて達成しており，かつ中間レポート，出席，および制作課題の合計点(100 点満点)が 90 点以上
A:達成目標をすべて達成しており，かつ中間レポート，出席，および制作課題の合計点(100 点満点)が 80 点以上
B:達成目標を 80%達成しており，かつ中間レポート，出席，および制作課題の合計点(100 点満点)が 70 点以上
C:達成目標を 60%達成しており，かつ中間レポート，出席，および制作課題の合計点(100 点満点)が 60 点以上

Examination

レポートで実施

By Report

Details of examination

制作課題の発表会を試験期間中に実施する.

Presentation of final exercise is carried out within the period of a regular exam.

Other information

Reference URL

Office hours

随時だが、電子メールで予約をとること。

Anytime, but requires a reservation by E-mail.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

情報検索、情報可視化、ビジュアル情報処理

Information visualization, Visual data mining, Visual information processing

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

Subject name[English]	Complex Systems and Intelligent Informatics 1[Complex Systems and Intelligent Informatics 1]				
Schedule number	M43630300	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	村越 一支 MURAKOSHI Kazushi				
Numbering	CMP_MAS53125				

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.

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

Self Preparation and Review

Related subjects

Notes for textbook

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.

Evaluation of achievement

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

Examination

その他

Other

Details of examination

Other information

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

Reference URL

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

Office hours

After this class

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner

(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

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

Subject name[English]	Complex Systems and Intelligent Informatics 2[Complex Systems and Intelligent Informatics 2]				
Schedule number	M43630310	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Wed.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	石田　好輝 ISHIDA Yoshiteru				
Numbering	CMP_MAS53125				

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.

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

Self Preparation and Review

Related subjects

Notes for textbook

No textbook. References other than below will be suggested at the first class.
Ishida, Y.: Self-Repair Networks, Springer (2015);
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%)

Examination

その他
Other

Details of examination

Other information

Room F-504, Ext. 6895

Reference URL

Office hours

Wednesday 16:30–17:00

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

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

(M43630370)Image Processing, Advanced 1[Image Processing, Advanced 1]

Subject name[English]	Image Processing, Advanced 1[Image Processing, Advanced 1]				
Schedule number	M43630370	**Subject area**	Advanced Computer Science and 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～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	金澤 靖 KANAZAWA Yasushi				
Numbering	CMP_MAS52525				

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

Self Preparation and Review

The handouts are available via web page beforehand.
The handouts are available via web page beforehand.

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			**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
Reference3	**Book title**	Guide to 3D Vision Computation			**ISBN**	
	Author	K. Kanatani, Y. Sugaya, and Y. Kanazawa	**Publisher**	Springer	**Publish year**	2016

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Grade will be determined by all submitted reports:
S: score >= 90
A: score >= 80
B: score >= 70
C: score >= 60

Grade will be determined by all submitted reports:
S: score >= 90
A: score >= 80
B: score >= 70
C: score >= 60

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

Reference URL

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

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

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

image processing, computer vision

image processing, computer vision

(M43630380)Image Processing, Advanced 2[Image Processing, Advanced 2]

Subject name[English]	Image Processing, Advanced 2[Image Processing, Advanced 2]				
Schedule number	M43630380	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	菅谷 保之 SUGAYA Yasuyuki				
Numbering	CMP_MAS52525				

Objectives of class

このコースではコンピュータビジョンにおける最適化手法について学習します。

This course involves fundamental and advanced optimization methods on computer vision.

Contents of class

1: Mathematical Introduction
2: Limits of Functions
3: Optimization of Functions
4: Least Squares
5: Advance of Least Squares
6: Non-linear Optimization
7: Maximum Likelihood
8: Examination
1: Mathematical Introduction
2: Limits of Functions
3: Optimization of Functions
4: Least Squares
5: Advance of Least Squares
6: Non-linear Optimization
7: Maximum Likelihood
8: Examination

Self Preparation and Review

The handouts are available via web page beforehand.
The handouts are available via web page beforehand.

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			**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
Reference3	**Book title**	Guide to 3D Vision Computation			**ISBN**	
	Author	K. Kanatani, Y. Sugaya, and Y. Kanazawa	**Publisher**	Springer	**Publish year**	2016

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Grade will be determined by all submitted reports:
S: score >= 90
A: score >= 80
B: score >= 70
C: score >= 60

Grade will be determined by all submitted reports:
S: score >= 90
A: score >= 80
B: score >= 70
C: score >= 60

Examination

レポートで実施
By Report

Details of examination

Other information

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

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

Reference URL

http://www.iim.cs.tut.ac.jp/~sugaya/lecture/e-image/

http://www.iim.cs.tut.ac.jp/~sugaya/lecture/e-image/

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

コンピュータビジョン、最適化手法
computer vision, optimization

(M43630390)Algorithm Engineering, Advanced[Algorithm Engineering, Advanced]

Subject name[English]	Algorithm Engineering, Advanced[Algorithm Engineering, Advanced]				
Schedule number	M43630390	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	藤戸　敏弘 FUJITO Toshihiro				
Numbering	CMP_MAS52525				

Objectives of class

離散最適化問題に対する数理計画的手法，および効率的アルゴリズムの設計方法を習得する．時間が許せば，計算困難（NP困難）な場合の対処法として，高精度近似アルゴリズムの設計方法を習得する．

To learn mathematical programming approaches for combinatorial optimization problems and how to design efficient algorithms for them. Designing high-performance approximation algorithms for computationally hard (NP-hard) problems will be covered as well, if time permits.

Contents of class

1．離散最適化問題へのイントロ
2．シュタイナー木問題の近似
3．TSP とオイラー閉路
4．TSP と集合被覆
5．線型計画法
6．線型計画の双対性
7．線形計画の（確率的）丸め法

1. Introduction to combinatorial optimization problems
2. Steiner Tree Approximation
3. TSP and Eulerian Cycles
4. TSP and Set Cover
5. Linear Programming
6. Linear Programming Duality
7. (Randomized) Rounding Linear Programs

Self Preparation and Review

ウェルカムページで事前に公開されている講義計画・講義用資料を参照して，予習・復習により講義内容とその理解を確認すること．

It is highly recommended to go through the course materials provided on the course welcome pages for self preparation and reviews.

Related subjects

「アルゴリズムとデータ構造」（「計算理論」や「形式言語論」も履修していることが望ましい）

"Algorithms and Data Structures" (to the lesser extent, "Theory of Computation" and "Formal Languages" are also related).

Notes for textbook

資料を配布する。

All the course materials used will be provided through the course home pages.

Reference1	**Book title**	Approximation Algorithms			**ISBN**	3540653678
	Author	Vijay V. Vazirani	**Publisher**	Springer	**Publish year**	2001
Reference2	**Book title**	Combinatorial Optimization: Exact and Approximate Algorithms			**ISBN**	
	Author	Luca Trevisan	**Publisher**		**Publish year**	

Notes for reference

Goals to be achieved

離散最適化問題の構造解析や効率的解法設計のために，線形計画を中心として数理計画法によるモデル化や双対定理，最大最小定理といった系統的手法を身につける．
To earn the ability of problem modelings, based on mathematical programmings (and LP in particular), and applying systematic approaches for structure analysis and algorithm designing for combinatorial optimization problems.

Evaluation of achievement

達成目標全体の達成を総合的に評価する定期試験(80%)およびレポート(20%)で評価する．
博士前期課程 1 年・博士後期課程 1 年／S:90 点以上，A:80 点以上、B:70 点以上、C:60 点以上
博士前期課程 2 年・博士後期課程 2，3 年／A:80 点以上、B:65 点以上、C:55 点以上
[Evaluation basis]
Students will be evaluated, in terms of goals to be achieved, based on total scores of exams (80%) and home works (20%) as follows:
For 1st year students in Master or Doctorate course,
S: 90 or higher (out of 100 points).
A: 80 or higher (out of 100 points).
B: 70 or higher (out of 100 points).
C: 60 or higher (out of 100 points).
For 2nd (or higher) year students in Master or Doctorate course,
A: 80 or higher (out of 100 points).
B: 65 or higher (out of 100 points).
C: 55 or higher (out of 100 points).

Examination

定期試験を実施（対面）
Examination(Face to Face)

Details of examination

Other information

Reference URL

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

Office hours

随時（e メールにより事前にアポイントメントをとってください）．
e メールによる質問も歓迎．
Arranged by appointment..

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about computer science and engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about computer science and engineering as well as related fields; and to utilize such knowledge in an integrated manner

Key words

アルゴリズム　組合せ最適化　線形計画法　計算量　近似アルゴリズム
algorithms, combinatorial optimization, linear programming, computational complexity, approximation algorithms

(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 Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS65015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

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

Notes for textbook

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

Notes for reference

Goals to be achieved

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

Evaluation of achievement

The evaluation is based on the scores of reading textbooks and scientific papers, discussions, reports and presentations of his/her research in the seminar. His/her supervisor evaluates the scores.
A: 80 or higher (out of 100 points),
B: 65 or higher (out of 100 points),
C: 55 or higher (out of 100 points)

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)

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

(M44610050)Seminar on Applied Chemistry and Life Science 1[Seminar on Applied Chemistry and Life Science 1]

Subject name[English]	Seminar on Applied Chemistry and Life Science 1[Seminar on Applied Chemistry and Life Science 1]				
Schedule number	M44610050	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS55015				

Objectives of class

This course will provide the students with opportunities to study on his/her research subjects on applied chemistry and life science 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 applied chemistry and life science.

Contents of class

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

Self Preparation and Review

Related subjects

Seminar on Applied Chemistry and Life Science 2
Thesis Research on Applied Chemistry and Life Science
All other relevant subjects in Applied Chemistry and Life Science

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 applied chemistry and life science
To understand the contents of scientific papers in a given field of applied chemistry and life science
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.
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

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)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words
Applied chemistry, Life science, Materials science and engineering

(M44610070)Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]

Subject name[English]	Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]				
Schedule number	M44610070	**Subject area**	Advanced Applied Chemistry and Life Science	**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	Applied Chemistry and Life Science			**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	ENV_MAS68015				

Objectives of class

In the course, the students will perform advanced researches on applied chemistry 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 Applied Chemistry and Life Science 1
Seminar on Applied Chemistry and Life Science 2

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 applied chemistry and life science
To master experimental techniques and analytical skills required for research on a given field of applied chemistry and life science
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).
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

Examination

試験期間中には何も行わない
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 Applied chemistry, Life science, Materials science and engineering

(M4461007T)Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]

Subject name[English]	Thesis Research on Applied Chemistry and Life Science[Thesis Research on Applied Chemistry and Life Science]				
Schedule number	M4461007T	**Subject area**	Advanced Applied Chemistry and Life Science	**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	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員, 4系各教員 4kei kyomu Iin-S, 4kei kakukyouin				
Numbering	ENV_MAS68015				

Objectives of class

In the course, the students will perform advanced researches on applied chemistry 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 Applied Chemistry and Life Science 1
Seminar on Applied Chemistry and Life Science 2

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 applied chemistry and life science
To master experimental techniques and analytical skills required for research on a given field of applied chemistry and life science
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).
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

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)

Reference URL

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

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

Applied chemistry, Life science, Materials science and engineering

(M44610080)Seminar on Applied Chemistry and Life Science[Seminar on Applied Chemistry and Life Science]

Subject name[English]	Seminar on Applied Chemistry and Life Science[Seminar on Applied Chemistry and Life Science]				
Schedule number	M44610080	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS65015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Thesis Research on Applied Chemistry and Life Science
All other relevant subjects in Applied Chemistry and Life Sciences

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire basic knowledge on applied chemistry and life science
To understand the contents of scientific papers in a given field of applied chemistry and life science
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.
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

Examination

試験期間中には何も行わない
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

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner

Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(D2) Have high-level skills to mutually respect the values of individual team member; and to contribute to the team's achievements through working cooperatively with other team members
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words
Applied chemistry, Life science, Materials science and engineering

(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**	Fri.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	伊津野 真一, 原口 直樹 ITSUNO Shinichi, HARAGUCHI Naoki				
Numbering	ENV_MAS52225				

Objectives of class

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

Self Preparation and Review

Related subjects

Organic Chemistry
Polymer chemistry

Notes for textbook

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

Evaluation of achievement

S:テスト・レポートの合計点(100 点満点)が 90 点以上
A:テスト・レポートの合計点(100 点満点)が 80 点以上
B:テスト・レポートの合計点(100 点満点)が 70 点以上
C:テスト・レポートの合計点(100 点満点)が 60 点以上
S: 90 or higher (out of 100 points)
A: 80 or higher (out of 100 points)
B: 70 or higher (out of 100 points)
C: 60 or higher (out of 100 points)

Examination

レポートで実施
By Report

Details of examination

Other information

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

B-403
6812
haraguchi@ens.tut.ac.jp

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

Office hours
Any time

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

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

Subject name[English]	Advanced Molecular Life Science[Advanced Molecular Life Science]				
Schedule number	M44630120	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	田中 照通, 梅影 創 TANAKA Terumichi, UMEKAGE So				
Numbering	ENV_MAS53225				

Objectives of class

Aim:
Students have to enlarge knowledge of biology, biochemistry, and molecular biology by reading good papers in this field.
Papers of Nobel Prize Laureates are used in this Class, to learn both importance and impact of the work.
Aim:
Students have to enlarge knowledge of biology, biochemistry, and molecular biology by reading good papers in this field.
Papers of Nobel Prize Laureates are used in this Class, to learn both importance and impact of the work.

Contents of class

Style:
No Lecture.
Students choose and read Nobel Prize Laureates' Papers, and Make a Presentation of the content.

in 2016: Dr. Tanaka will control the Class.

Before the presentation by the Students begins, Dr. Tanaka will have guidance of Biochemistry and Molecular Biology.
Style:
No Lecture.
Students choose and read Nobel Prize Laureates' Papers, and Make a Presentation of the content.

in 2016: Dr. Tanaka will control the Class.

Before the presentation by the Students begins, Dr. Tanaka will have guidance of Biochemistry and Molecular Biology.

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. (by 30th, Oct., 2018)
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.　(by 30th, Oct., 2018)
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

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement
For the Credit:
40 credits for each Presentation. (40x2=80)
You can get up to 20 credits by Good questions and comment to the Audience.

S: 90 or higher (out of 100 points)
A: 80 or higher (out of 100 points)
B: 70 or higher (out of 100 points)
C: 60 or higher (out of 100 points)
For the Credit:
40 credits for each Presentation. (40x2=80)
You can get up to 20 credits by Good questions and comment to the Audience.

S: 90 or higher (out of 100 points)
A: 80 or higher (out of 100 points)
B: 70 or higher (out of 100 points)
C: 60 or higher (out of 100 points)

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

Details of examination

Other information
Contact (e-mail): terumichi-tanaka@tut.jp
Contact (e-mail): terumichi-tanaka@tut.jp

Reference URL

Office hours
any time, but e-mail must be sent to me in advance.
any time, but e-mail must be sent to me in advance.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words
Nobel prize, presentation, molecular biology, biochemistry
Nobel prize, presentation, molecular biology, biochemistry

(M44630310)Advanced Separation Chemistry[Advanced Separation Chemistry]

Subject name[English]	Advanced Separation Chemistry[Advanced Separation Chemistry]				
Schedule number	M44630310	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.4～4	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	齊戸 美弘 SAITO Yoshihiro				
Numbering	ENV_MAS52225				

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.

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.

Self Preparation and Review

Related subjects

Notes for textbook

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.

[Evaluation basis] Students who attend all classes will be evaluated as follows:
S: Achieved all goals and obtained total points of presentation or reports, 90 or higher (out of 100 points).
A: Achieved 80 % of goals and obtained total points of presentation or reports, 80 or higher (out of 100 points).
B: Achieved 70 % of goals and obtained total points of presentation or reports, 70 or higher (out of 100 points).
C: Achieved 60 % of goals and obtained total points of presentation or reports, 60 or higher (out of 100 points).

Examination

レポートで実施
By Report

Details of examination

Other information

Y. Saito; Room# B-402; 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.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

(M44630320)Applied Physical Chemistry[Applied Physical Chemistry]

Subject name[English]	Applied Physical Chemistry[Applied Physical Chemistry]				
Schedule number	M44630320	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	松本 明彦 MATSUMOTO Akihiko				
Numbering	ENV_MAS52225				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Reference handouts will be provided in the class.

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

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

Notes for reference

Goals to be achieved

Evaluation of achievement

Achievemtnt will be evaluated only by the final examination.
S: remarks of the final exam is more than 90%
A: remarks of the final exam is 80-89%
B: remarks of the final exam is 70-79%
C: remarks of the final exam is 60-69%
D(Fail): remarks of the final exam is less than 60%

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

Final Examination will be strictly administered.

Other information

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

Reference URL

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

(M44630330)Advanced Genomics[Advanced Genomics]

Subject name[English]	Advanced Genomics[Advanced Genomics]				
Schedule number	M44630330	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	浴 俊彦 EKI Toshihiko				
Numbering	ENV_MAS53225				

Objectives of class

Students will learn the significance and methods for genomics in basic and applied biological sciences. The aim of this class is to improve the ability to present and discuss with each other by reading effective research papers published in high-impact journals.

Contents of class

1st week: Introduction of genomics
2nd week: Genome structural analyses
3rd week: Genome functional analyses(1)
4th week: Genome functional analyses(2)
5th week: Applications of genomics
6th week: Presentation of subjected papers by students (1)
7th week: Presentation of subjected papers by students (2)
Note: The number of presentation depends on the number of students.
8th week: Review

Self Preparation and Review

Handout and effective research papers will be given. Students are strongly encouraged to preview and review of these materials.

Related subjects

Related subjects: Molecular Biology I and II, Genetic Engineering

Notes for textbook

Handout and effective research papers will be provided.

Reference1	**Book title**	Principles of Genome Analysis and Genomics 3rd Ed			**ISBN**	1-4051-0120-2
	Author	S. B. Primrose and R. M. Twyman	**Publisher**	Blackwell Publishing	**Publish year**	2003

Notes for reference

Goals to be achieved

To understand and describe basic technical terms in genomics.
To be able to read papers in genomics journals.
To make an oral presentation of effective research papers.

Evaluation of achievement

Grades for the course will be based on the subject scores.

[Evaluation basis] Students who attend all classes will be evaluated as follows:

M1:
S: Achieved all goals and obtained total points of presentation and reports, 90 or higher (out of 100 points).
A: Achieved 80% of goals and obtained total points of presentation and reports, 80 or higher (out of 100 points).
B: Achieved 70% of goals and obtained total points of presentation and reports, 70 or higher (out of 100 points).
C: Achieved 60% of goals and obtained total points of presentation and reports, 60 or higher (out of 100 points).

M2:
A: Achieved all goals and obtained total points of presentation and reports, 80 or higher (out of 100 points).
B: Achieved 70% of goals and obtained total points of presentation and reports, 65 or higher (out of 100 points).
C: Achieved 60% of goals and obtained total points of presentation and reports, 55 or higher (out of 100 points).

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

T. Eki (G505, ex. 6907) e-mail: eki@ens.tut.ac.jp

Reference URL

Office hours

Make an appointment by e-mail.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(D) Communication skills for global success
Have the communication skills to effectively express one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members
(D1) Have the skills to effectively express and communicate one's own ideas as well as points in question at home and abroad through papers, oral reports or information media
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

genomics, metagenomics

(M44630370)Advanced Life Science and Biotechnology 1[Advanced Life Science and Biotechnology 1]

Subject name[English]	Advanced Life Science and Biotechnology 1[Advanced Life Science and Biotechnology 1]				
Schedule number	M44630370	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS53225				

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.

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.

Self Preparation and Review

Related subjects

Advanced Life Science and Biotechnology 2

Notes for textbook

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.

Evaluation of achievement

The evaluation is based on the scores of reports, presentations, and examination.
His/her supervisor evaluates the scores.
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

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

(M44630390)Advanced Materials Chemistry 1[Advanced Materials Chemistry 1]

Subject name[English]	Advanced Materials Chemistry 1[Advanced Materials Chemistry 1]				
Schedule number	M44630390	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS52225				

Objectives of class

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

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.

Self Preparation and Review

Related subjects

Advanced Materials Chemistry 2

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on materials chemistry.
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.
His/her supervisor evaluates the scores.
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner

(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words
Applied chemistry, Life science, Materials science and engineering

(M44630410)Advanced Chemical Technology 1[Advanced Chemical Technology 1]

Subject name[English]	Advanced Chemical Technology 1[Advanced Chemical Technology 1]				
Schedule number	M44630410	**Subject area**	Advanced Environmental and Life Sciences	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	ENV_MAS52225				

Objectives of class

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

Self Preparation and Review

Related subjects

Advanced Chemical Technology 2

Notes for textbook

Supervisor will recommend textbooks and papers to students.

Notes for reference

Goals to be achieved

To acquire advanced knowledge on chemical technology.
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.
His/her supervisor evaluates the scores.
S: 90 or higher (out of 100 points),
A: 80 or higher (out of 100 points),
B: 70 or higher (out of 100 points),
C: 60 or higher (out of 100 points)

Examination

試験期間中には何も行わない
None during exam period

Details of examination

Other information

Supervisor

Reference URL

Office hours

Students are encouraged visiting by appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated manner
Have advanced knowledge about applied chemistry and life science as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving in an integrated manner
(C1) Have the skills to voluntarily acquire theories and applied knowledge about applied chemistry and life science as well as related fields; and to utilize such knowledge in an integrated manner
(C2) Have the skills to learn, by experience, methodologies for research and development through integrating extensive

knowledge about applied chemistry and life science as well as related fields; to make plans for research and development and put them into practice; and to create new technologies to solve problems
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the skills to voluntarily make plans and learn throughout one's life in response to changes in society, environment and technology

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering I[Seminar on Architecture and Civil Engineering I]				
Schedule number	M45610010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	3
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
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	ARC_MAS51015				

Objectives of class

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Examination

その他

Other

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～
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	ARC_MAS61015				

Objectives of class

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

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Examination

その他

Other

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**	1～1
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering	ARC_MAS51025				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

TBD by the laboratory

Notes for textbook

TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

その他

Other

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

(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**	1～1
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1, M2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering	ARC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

TBD by the laboratory

Notes for textbook

TBD by the laboratory

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

その他

Other

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Thesis Research on Architecture and Civil Engineering[Thesis Research on Architecture and Civil Engineering]				
Schedule number	M4561003T	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～2
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員, 5系各教員 5kei kyomu Iin-S, 5kei kakukyouin				
Numbering	ARC_MAS61015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

Examination

試験期間中には何も行わない

None during exam period

Details of examination

Other information

Refer to administration office.

Reference URL

Refer to the URL of each laboratory

Office hours

Refer to administration office.

Relations to attainment objectives of learning and education

Key words

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

Subject name[English]	Seminar on Architecture and Civil Engineering[Seminar on Architecture and Civil Engineering]				
Schedule number	M45610040	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	6
Faculty	Graduate Program for Master's Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS51015				

Objectives of class

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

Contents of class

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

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

Report

Examination

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～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	中澤 祥二 NAKAZAWA Shoji				
Numbering	ARC_MAS52125				

Objectives of class

このコースは、有限要素解析とトラス構造などの単純なバーのコンピュータプログラミングを使用して、静的解析の基礎を学習します。

The course provides fundamentals for static analysis by using Finite Element Analysis and computer programming for simple bar, such as truss structures.

Contents of class

1. 弾性力学の基礎とその応用分野
2.-3. トラス要素に対する仮想仕事の原理
3.-4. トラス要素に対する最小ポテンシャルエネルギー原理
5.-6. トラス構造の有限要素法の定式化
7. トラス構造の剛性マトリクス
8. 多自由度の線形連立方程式のための数値解法
9.-12. FEM プログラムの構造
13.-14. 数値解析の例題
15. 3D 梁要素への拡張の導入
1. Fundamental of elasticity and its application fields
2.-3. Principle of virtual work for bar elements
3.-4. Principle of minimum potential energy for bar elements
5.-6. Formulation of finite element method of truss structures
7. Stiffness matrix of truss structures
8. Numerical solution for linear simultaneous equations with multiple degrees of freedom
9.-12. Structure of FEM program
13.-14. Example of numerical analysis
15. Introduction of extension to 3D beam elements

Self Preparation and Review

Related subjects

Notes for textbook

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

Reference1	**Book title**	Concepts and Applications of finite Element Analysis			**ISBN**	
	Author	Robert D. Cook	**Publisher**		**Publish year**	

Notes for reference

Goals to be achieved

1)エネルギ原理(最小ポテンシャルエネルギ停留の原理、仮想仕事の原理)を理解すること
2)トラス構造物の有限要素法を理解すること
3)有限要素法プログラミングと多自由度連立方程式の解法を理解すること
1) To understand the principle of energy (principle of minimum potential energy retention, principle of virtual work)
2) To understand the finite element method of truss structures
3) To understand the finite element method programming and the solution of simultaneous equations with multiple degrees of freedom

Evaluation of achievement

評価基準:原則的にすべての講義に出席し，かつすべての演習問題レポートを提出したものにつき、下記のように成績を評価する。
S:達成目標をすべて達成しており，かつテストの合計点(100 点満点)が 90 点以上
A:達成目標を 90%達成しており，かつテストの合計点(100 点満点)が 80 点以上
B:達成目標を 80%達成しており，かつテストの合計点(100 点満点)が 70 点以上
C:達成目標を 70%達成しており，かつテストの合計点(100 点満点)が 60 点以上
[Evaluation basis] Students who attend all the classes and submitted all the exercise reports will be evaluated as follows:
S: Obtained total points of exams, 90 or higher (out of 100 points).
A: Obtained total points of exams, 80 or higher (out of 100 points).
B: Obtained total points of exams, 70 or higher (out of 100 points).
C: Obtained total points of exams, 60 or higher (out of 100 points).

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

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

Office hours
月曜日 16:30-17:30
16:30 to 17:30 on Monday

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.2～2	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	三浦 均也 MIURA Kinya				
Numbering	ARC_MAS52725				

Objectives of class

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

Self Preparation and Review

Related subjects

Geolpgic hazards and mitigation planning (English Masre course)

Notes for textbook

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.

Evaluation of achievement

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

Reference URL

under preparing

Office hours

12:00-14:00 on Wednesday

Relations to attainment objectives of learning and education

not specified

Key words
Disaster, Earthquake, Geologic Hazards, Numerical Analysis

(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**	Tue.5～5	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	藤原 孝男 FUJIWARA Takao				
Numbering	ARC_MAS55025				

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.

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, and 6)Eco-system for high-tech entrepreneurship or start-ups.

This academic year's schedule (each week) regarding real options will be following:
1-2: What is real options?
3-4: Net Present Value as benchmark
5: Decision tree
6-7: Simple options
8-9: Compounded options and switching options
10-11: Multi-period steps
12-13: The 4-stage evaluation method for real options
14-15: Volatility estimation

Self Preparation and Review

Related subjects

Management Science (English), Operations Management (Japanese), Game Theory (Japanese), Real Options (Japanese), Entrepreneurship (Japanese), Management(Japanese) & Innovation Management (Japanese).

Notes for textbook

Study materials will be introduced at first class date.

Notes for reference

Goals to be achieved

1)Able to understand the function of business plan for transformation of technological ideas into economic value.
2)Able to understand the risk-hedge model for irreversible investment under uncertainty.
3)Able to understand the necessary of strategic response to competitors for survival.

Evaluation of achievement

[Evaluation criteria] Students attending all classes will be evaluated as follows:
A: Achieved at least 80% goals and obtained total points of exam and reports, 80 or higher (out of 100 points).
B: Achieved at least 65% of goals and obtained total points of exam and reports, 65 or higher (out of 100 points).
C: Achieved at least 55% of goals and obtained total points of exam and reports, 55 or higher (out of 100 points).

Examination

その他
Other

Details of examination

Other information Office#: B-313, Phone#: 6946, e-mail: fujiwara@las.tut.ac.jp
Reference URL
Office hours Anytime if available.
Relations to attainment objectives of learning and education
Key words 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～
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	ARC_MAS52025				

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.

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Subject name[English]	Advanced Environmental System Planning and Design I[Advanced Environmental System Planning and Design I]				
Schedule number	M45630210	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS54025				

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.

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

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

Subject name[English]	Advanced Regional System Planning and Design I[Advanced Regional System Planning and Design I]				
Schedule number	M45630230	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	2
Faculty	Graduate Program for Master's Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_MAS53025				

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.

Contents of class

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

Evaluation of achievement

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

(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～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	M1
Charge teacher name[Roman alphabet mark]	齊藤　大樹 SAITOH Taiki				
Numbering	ARC_MAS52125				

Objectives of class

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

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

Contents of class

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

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

Self Preparation and Review

Related subjects

None

None

Notes for textbook

Notes for reference

Goals to be achieved

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

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

Evaluation of achievement

Report

Report

Examination

レポートで実施

By Report

Details of examination

Other information

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

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

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

Key words