Syllabus

International Doctoral Degree Program

（2021-Fall Term）

(D51010010)Advanced Seminar on Mechanical Engineering 1[Advanced Seminar on Mechanical Engineering 1]

Subject name[English]	Advanced Seminar on Mechanical Engineering 1[Advanced Seminar on Mechanical Engineering 1]				
Schedule number	D51010010	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_DOC71015				

Objectives of class

Knowledge from fundamental to advanced levels are acquired in each research field of mechanical engineering. Abilities for problem-solving, problem-questing, and judgement, and presentation skill are polished up at seminar of this class.

Knowledge from fundamental to advanced levels are acquired in each research field of mechanical engineering. Abilities for problem-solving, problem-questing, and judgement, and presentation skill are polished up at seminar of this class.

Contents of class

Content of this class will be set in each laboratory.

Content of this class will be set in each laboratory.

Self Preparation and Review

Preparation for next class and a review after each class are carried out.

Preparation for next class and a review after each class are carried out.

Related subjects

Inquire this of your supervisor.

Inquire this of your supervisor.

Notes for textbook

Inquire this of your supervisor.

Inquire this of your supervisor.

Notes for reference

N/A

N/A

Goals to be achieved

(1) Knowledge from fundamental to advanced levels is acquired in each research field of mechanical engineering.to perform research.
(2) Contents of literature are understood and presented accurately and briefly.
(3) Problem-setting is found by developing content of literature.

(1) Knowledge from fundamental to advanced levels is acquired in each research field of mechanical engineering.to perform research.
(2) Contents of literature are understood and presented accurately and briefly.
(3) Problem-setting is found by developing content of literature.

Evaluation of achievement

The achivement is evaluated based on the results of paper introduction, understanding of papers, answers to questions, and on the contribution to discussion.
Grade levels are C(60% - less than 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over).

The achivement is evaluated based on the results of paper introduction, understanding of papers, answers to questions, and on the contribution to discussion.
Grade levels are C(60% - less than 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

None during exam period

None during exam period

Other information

Inquire this of your supervisor.

Inquire this of your supervisor.

Reference URL

N/A

N/A

Office hours

Contact your supervisor.

Contact your supervisor.

Relations to attainment objectives of learning and education

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

Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.

Key words

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

(D51010020)Advanced Seminar on Mechanical Engineering 2[Advanced Seminar on Mechanical Engineering 2]

Subject name[English]	Advanced Seminar on Mechanical Engineering 2[Advanced Seminar on Mechanical Engineering 2]				
Schedule number	D51010020	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Year	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S1系教務委員 1kei kyomu Iin-S				
Numbering	MEC_DOC71015				

Objectives of class

Knowledge from fundamental to advanced levels are acquired in each research field of mechanical engineering. Abilities for problem-solving, problem-questing, and judgement, and presentation skill are polished up at seminar of this class.

Knowledge from fundamental to advanced levels are acquired in each research field of mechanical engineering. Abilities for problem-solving, problem-questing, and judgement, and presentation skill are polished up at seminar of this class.

Contents of class

Content of this class will be set in each laboratory.

Content of this class will be set in each laboratory.

Self Preparation and Review

Preparation for next class and a review after each class are carried out.

Preparation for next class and a review after each class are carried out.

Related subjects

Inquire this of your supervisor.

Inquire this of your supervisor.

Notes for textbook

Inquire this of your supervisor.

Inquire this of your supervisor.

Notes for reference

N/A

N/A

Goals to be achieved

(1) Knowledge from fundamental to advanced levels is acquired in each research field of mechanical engineering.to perform research.
(2) Contents of literature are understood and presented accurately and briefly.
(3) Problem-setting is found by developing content of literature.

(1) Knowledge from fundamental to advanced levels is acquired in each research field of mechanical engineering.to perform research.
(2) Contents of literature are understood and presented accurately and briefly.
(3) Problem-setting is found by developing content of literature.

Evaluation of achievement

The achivement is evaluated based on the results of paper introduction, understanding of papers, answers to questions, and on the contribution to discussion.
Grade levels are C(60% - less than 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over).

The achivement is evaluated based on the results of paper introduction, understanding of papers, answers to questions, and on the contribution to discussion.
Grade levels are C(60% - less than 70%), B(70- less than 80%), A(80% - less than 90 %) and S(90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

None during exam period

None during exam period

Other information

Inquire this of your supervisor.

Inquire this of your supervisor.

Reference URL

N/A
N/A

Office hours

Contact your supervisor.
Contact your supervisor.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.

Key words

Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy
Mechanical engineering, Mechanical system design, Materials and manufacturing, System control and robotics, Environment and energy

(D51010050)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D51010050	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S1系教務委員, 教務委員会副委員長 1kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71015				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.
New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.
1) Presentations
In this class, each student will make a presentation to other students of different research fields.
So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.
*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation
Not only D2 students, but also other students are welcome to attend the presentation.
So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.
We will post it on the bulletin board inside the campus.

3) Report you will submit
You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation
Please check the schedule given before the semester begins.

5) Absence from the class
Basically, you have to attend every class.
If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

(*) If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.
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Self Preparation and Review
Review each lecture and prepare for the next class with reference to the textbook.

Review each lecture and prepare for the next class with reference to the textbook.

Related subjects
N/A
N/A

Notes for textbook
N/A
N/A

Notes for reference
N/A
N/A

Goals to be achieved
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement
Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90 %) and S(90% or over).
Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90 %) and S(90% or over).

Examination
レポートで実施
By Report

Details of examination
N/A
N/A

Other information
Contact the educational affairs division for inquiry.
Contact the educational affairs division for inquiry.

Reference URL

N/A
N/A

Office hours

Before/after the class
Before/after the class

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。
(E)最新の技術や社会環境の変化に対する探究心と持続的学習力
社会，環境，技術等の変化の本質を探求し，生涯にわたって自発的に計画し学習する能力を身につけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.
(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, and the high ability to contribute to the goals of the team as a leader
(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 investigate the nature of change in society, environment and technology, and voluntarily make plans and learn throughout one's life

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Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner
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Key words

Interdisciplinary Research
Interdisciplinary Research

(D51020010)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	D51020010	**Subject area**	Advanced Mechanical Engineering	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎 kyoumu iinkai fukuiintyou, TANAKA Saburo				
Numbering	COM_DOC51005				

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 (October 6, 2021): Introduction, 1st module in e-learning
2nd – 6th week (October 13 – November 17): 2nd – 7th modules in e-learning
Submit the e-learning Certificate to the Educational Affairs Division
7th week: (November 24 – November 30)Discussion with supervisor
8th week: Report (December 1, 2021)

e-learning
1st module: Research Misconduct
2nd module: Ethical Issues in the Management of Data in Engineering Research
3rd module: Responsible Authorship
4th module: Ethical Issues in the Peer Review and Publication of Engineering Research
5th module: Collaborative Research in Engineering Fields
6th module: Whistleblowing and the Obligation to Protect the Public
7th module: Managing Public Research Funds

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students will need to review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

N/A

Reference1	**Book title**	For the sound development of science : the attitude of a conscientious scientist			**ISBN**	978-4-621-08938-5
	Author	edited by Japan Society for the Promotion of Science Editing Committee "For the Sound Development of Science"	**Publisher**	Maruzen	**Publish year**	2015

Notes for reference

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' research specialties.

Evaluation of achievement

[Evaluation method] Report(100%)

[Evaluation 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

N/A

Reference URL

N/A

Office hours

Before/after the class

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性
上級技術者・研究者として社会的・倫理的責任を有し，社会における技術的課題を設定・解決・評価する能力を身につけている。
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について考える能力を身につけている。

(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。
(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; and have the ability to set, solve and evaluate technical issues in society
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as public welfare

(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, and thehigh ability to contribute to the goals of the team as a leader

Key words

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

(D51030020)Advanced Production Processes[Advanced Production Processes]

Subject name[English]	Advanced Production Processes[Advanced Production Processes]				
Schedule number	D51030020	**Subject area**	Advanced Mechanical 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 Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	柴田 隆行, 安部 洋平, 永井 萌土 SHIBATA Takayuki, ABE Yohei, NAGAI Moeto				
Numbering	MEC_DOC73025				

Objectives of class

(Y. Abe)

With the recent development of computers, numerical methods tend to be used in the field of manufacturing processes. Simulation such finite element simulation is commonly used for process design of metal forming. the objectives of this lecture is understanding of flow stress, failure, fracture, friction and lubrication in metal forming to use finite element simulation of metal forming process.

(T. Shibata and M. Nagai)

In addition, the objectives of this course is to introduce fundamentals of conventional micromachining technologies and the-state-of-art nanomachining technologies, and their application in the development of "Micro/Nano Electro Mechanical System (MEMS/NEMS)".

Contents of class

(Y. Abe)

(on-demand) 1st week:
1) Simulation in metal forming. Slab method and finite element method.
2) Stress-strain curves: flow stress. Uni-axial tension test. Flow curve.
(on-demand) 2nd week: Stress-strain curves.
1) Effect of temperature, strain rate and hydro static stress. Hot, worm and cold working.
2) Uni-axial compression test.
(on-demand) 3rd week: Stress-strain curves.
1) Plane strain compression test.
2) Temparature rise during deformation.
(on-demand) 4th week:
1) Plastic anisotropy. r-value, Lankford value. Plastic anisotropy and deep drawing. Plastic anisotropy and yield criteria
2) Failure and fracture of materials. Ductile fracture, Brittle fracture, buckling.
3) Ductile fracture criteria. Cockcroft-Latham ductile fracture criteria. Nakajima test.
(on-demand) 5th week:
1) Formability of sheet metals. Forming Limit Diagram (FLD). Scribed circle method.
2) Buckling of colum.
3) Surface structure and properties.
(on-demand) 6th week:
1) Surface structure and properties.
2) Determination of friction coefficient.
(on-demand) 7th week:
1) Lubrication.
2) Reynolds equation in metal forming.

(T. Shibata and M. Nagai)

8th week: Introduction of MEMS/NEMS
9th week: Photolithography
10th week: Wet etching and dry etching
11th week: Physical vapor deposition (PVD) and chemical vapor deposition (CVD)
12th week: Plating, electroforming, and bonding process
13th week: Surface micromachining and bulk micromachining
14th week: Microactuators and scaling law
15th week: State-of-the-art in micro/nanomarching technologies

Note:

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Students are required to prepare and review each lesson.

Related subjects

(Y. Abe) fundamentals of solid mechanics
(T. Shibata and M. Nagai) Micromachining Engineering

Notes for textbook

Notes for reference

(T. Shibata and M. Nagai)
Useful information on MEMS technologies can be obtained from the following website; http://www.memsnet.org/mems/
Reference: (1) M.J. Madou, "Fundamentals of Microfabrication, 2nd ed.", CRC Press, 2002. (2) S. Franssila, "Introduction to Microfabrication", John Wiley & Sons, 2004. (3) M. Gad-El-Hak, "The MEMS Handbook, 2nd ed.", CRC Pr I Llc, 2006.

Goals to be achieved

(Y. Abe)
To understand flow stress, failure, fracture, friction and lubrication in metal forming to use finite element simulation of metal forming process
(T. Shibata and M. Nagai)
To gain an understanding of the principles of micro/nanomachining technologies and to apply knowledge of the technologies to the design and manufacturing of a micro/nanodevice

Evaluation of achievement

(Y. Abe)
Reports : 100%
(T. Shibata and M. Nagai)
Written report : 100%

Examination

レポートで実施
By Report

Details of examination

Other information

Yohei Abe: room D-604, extension number: 6705, e-mail: abe@me.tut.ac.jp
Takayuki Shibata: room D-605, extension number: 6693, e-mail: shibata@me.tut.ac.jp
Moeto Nagai: room D-607, extension number: 6701, e-mail: nagai@me.tut.ac.jp

Reference URL

http://plast.me.tut.ac.jp/index.eng.html (Y. Abe)
http://mems.me.tut.ac.jp/ (T. Shibata and M. Nagai)

Office hours

Relations to attainment objectives of learning and education

機械工学専攻
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

Graduate Program of Mechanical Engineering for Doctoral Degree
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner

Key words

Y. Abe: forming processes, solid mechanics, finite element method // T. Shibata and M. Nagai: micro/nanomachining, MEMS/NEMS

(D51030040)Advanced Materials Science[Advanced Materials Science]

Subject name[English]	Advanced Materials Science[Advanced Materials Science]				
Schedule number	D51030040	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.2～2	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	三浦　博己, 戸高　義一, 小林　正和 MIURA Hiromi, TODAKA Yoshikazu, KOBAYASHI Masakazu				
Numbering	MEC_DOC74025				

Objectives of class

Learn knowledge and application about strength･fracture and problems･solutions of materials' microstructures on the base of material science necessary for safe and reliable usages of materials. Learn methods for experiments and the evaluation on the base academic understanding. Learn mechanisms of manifestation of functions and properties in relation with processing for the manifestation, because controls of properties and optimization of structural･functional materials are now carried out.

Contents of class

【face to face】1st：Introduction (MIURA)
(Deformation, fracture and microstructural control of materials and the recent related topics)
【on-demand】2nd：Microstructural control and improvement of mechanical property (MIURA)
【on-demand】3rd：Dynamic recrystallization and microstructural control Ⅰ (MIURA)
【on-demand】4th：Dynamic recrystallization and microstructural control Ⅱ (MIURA)
【on-demand】5th：Static recrystallization and microstructural control (MIURA)

【face to face】6th：Evaluation and analysis of material microstructure 1 (KOBAYASHI)
(Synchortron radiation, Imaging, Tomography)
【on-demand】7th：Evaluation and analysis of material microstructure 2 (KOBAYASHI)
(Image processing, Modeling)
【on-demand】8th：Evaluation and analysis of material microstructure 3 (KOBAYASHI)
(Orientation analysis)
【on-demand】9th：Evaluation and analysis of material microstructure 4 (KOBAYASHI)
(Texture analysis)

【face to face】10th：Microstructure of Materials 1 (TODAKA)
(Structure, Lattice Defect)
【on-demand】11th：Microstructure of Materials 2 (TODAKA)
(Phase Diagram, Solidification, Diffusion)
【on-demand】12th：Microstructure of Materials 3 (TODAKA)
(Deformed Structure, Recovery, Recrystallization, Phase Transformation)
【on-demand】13th：Strength of Materials 1 (TODAKA)
(Strengthening Mechanism, Heat Treatment and Deformation Process)
【on-demand】14th：Strength of Materials 2 (TODAKA)
(Plastic Deformation and Microstructure)

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the course content and evaluation of achievement are subject to change.
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＊ If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.
－－－－－
【on-demand】: You can take the class whenever you want.
【face to face】: Regular face to face class.
－－－－－

Self Preparation and Review

Self Preparation and Review are essential.

Related subjects

B3 機械の材料と加工(Materials and Processing in Mechanical Engineering), 材料物理化学
B4 材料信頼性工学, 構造材料学(Structural Materials), 材料解析
M1 材料保証学, 材料機能制御工学特論(Advanced Materials Function Control Engineering)

Textbook1	**Book title**	N/A			**ISBN**	
	Author		**Publisher**		**Publish year**	

Notes for textbook

The text for lecture is distributed.

Reference1	**Book title**	Recrystallization and related annealing phenomena			**ISBN**	978-0-08-044164-1
	Author	F.J.Humphreys and M.Hatherly	**Publisher**	Elsevier	**Publish year**	2004
Reference2	**Book title**	Materials Science and Engineering: An Introduction, 8th Edition			**ISBN**	978-0470419977
	Author	William D. Callister, David G. Rethwisch	**Publisher**	John Wiley and Sons	**Publish year**	2009
Reference3	**Book title**	材料の科学と工学 <1> - <4>			**ISBN**	978-4563067120
	Author	W.D. キャリスター(著), William D.,Jr. Callister (原著), 入戸野 修(翻訳)	**Publisher**	培風館	**Publish year**	2002

Notes for reference

参考書
書名「マテリアル工学シリーズ 2 材料組織学」, 著者名:高木節雄, 津崎兼彰, 出版社:朝倉書店, ISBN:978-4254236927, 出版年:2000

参考書
書名「マテリアル工学シリーズ 3 材料強度学」, 著者名:加藤雅治, 熊井真次, 尾中晋, 出版社:朝倉書店, ISBN:978-4254236934, 出版年:1999

Goals to be achieved

1. Understand mechanisms of deformation, fracture and microstructural control of materials and the related recent topics
2. Understand meanings of microstructural control and improvement of mechanical property
3. Understand mechanisms of dynamic recrystallization and microstructural control for actual applications
4. Understand mechanisms of static recrystallization and microstructural control for actual applications
5. Understand and explain imaging technique by using synchrotron radiation
6. Understand and explain representation of crystallographic orientation
7. Understand and explain relationship between microstructure and properties
8. Propose heat treatment and deformation process for control of microstructure and properties

Evaluation of achievement

Evaluation of results : intermediate reports(50%)and term-end final report(50%)
Criterion: evaluate results for the students presented at all the lectures essentially as below.

S: achieve all objectives and total marks of reports and exam. over 90.
A:achieve 7 objectives and total marks of reports and exam. over 80.
B:achieve 6 objectives and total marks of reports and exam. over 70.
C:achieve 5 objectives and total marks of reports and exam. over 60.

Examination

レポートで実施
By Report

Details of examination

Professors indicate individually.

Other information

＜Miura＞ miura@me.tut.ac.jp
＜Kobayashi＞ m-kobayashi@me.tut.ac.jp
todaka@me.tut.ac.jp
When you take this lecture, please contact with three teachers.

Reference URL

＜Miura＞ http://str.me.tut.ac.jp
＜Kobayashi＞ http://str.me.tut.ac.jp
＜Todaka＞ http://martens.me.tut.ac.jp/

Office hours

＜Miura＞ Please send e-mail in advance for appointment.
＜Kobayashi＞ Please send e-mail in advance for appointment.
＜Todaka＞ Please send e-mail in advance for appointment.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.

(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 investigate the nature of change in society, environment and technology, and voluntarily make plans and learn throughout one's life

Key words

properties, crystal structure, microstructure, heat treatment, mechanical process

(D51030080)Advanced Environmental Engineering[Advanced Environmental Engineering]

Subject name[English]	Advanced Environmental Engineering[Advanced Environmental Engineering]				
Schedule number	D51030080	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	柳田 秀記, 飯田 明由, 関下 信正, 横山 博史 YANADA Hideki, IIDA Akiyoshi, SEKISHITA Nobumasa, YOKOYAMA Hiroshi				
Numbering	MEC_DOC76025				

Objectives of class

The class aims to acquire advanced knowledge necessary for tackling energy and environmental problems in future from the standpoint of thermal and fluid engineering.

Contents of class

(on-demand) 1st to 7th weeks:(Prof.Iida and Prof.Sekishita)
Each student is requested to read English papers that treat atmospheric turbulence, air pollution, building wind and heat island, to introduce the contents of the papers, and to discuss them with the other students and the lecturer. Fundamental theories and recent trend of heat and mass transfer problems and urban air pollution are acquired through this process.

(face to face or remote simultaneous interactive)8th week: Presentation, report and summary

(on-demand) 9th to 15th weeks:(Prof.Yanada and Prof.Yokoyama)
Each student is requested to read a few English papers that treat fluid filtration technologies utilizing mechanical phenomena and numerical simulations of mixing, aeroacoustic and fluid phenomena, to introduce the contents of the papers, and to discuss them with the other students and the lecturer. Fundamental theories and recent trend of fluid filtration technologies and aeroacoustic are acquired through this process.

(face to face or remote simultaneous interactive)16th week: Presentation, report and summary

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Study the fundamental theories necessary for understanding the technical papers and carefully prepare for the introduction of the papers.

Related subjects

Hydrodynamics, Instrumentation engineering, Statistical mechanics, Computational fluid dynamics

Notes for textbook

English technical papers are used.

Notes for reference

N/A

Goals to be achieved

To understand the fundamentals of renewable energy and theory of wind turbine.
To understand fundamental theories and technical trends of Atmospheric Diffusion and Air Pollution.
To understand methods and theories of fluid filtration utilizing mechanical phenomena.
To understand methods and theories of aeroacoustics and numarical simulation.

Evaluation of achievement

Report 100%

Examination

レポートで実施
By Report

Details of examination

N/A

Other information

Contact
yanada@me.tut.ac.jp
seki@me.tut.ac.jp

iida@me.tut.ac.jp
h-yokoyama@me.tut.ac.jp

Reference URL

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

Office hours

Inquire this of the lecturers by e-mail.

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.

(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner

Key words

Energy, Environment, Wind power generation, Windmill, Atmospheric turbulence, Atmospheric diffusion, Liquid filtration, Aerodynamic noise, Numerical simulation

(D51030090)Advanced Systems and Instrumentation Engineering[Advanced Systems and Instrumentation Engineering]

Subject name[English]	Advanced Systems and Instrumentation Engineering[Advanced Systems and Instrumentation Engineering]				
Schedule number	D51030090	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	内山　直樹, 真下　智昭, 高山　弘太郎 UCHIYAMA Naoki, MASHIMO Tomoaki, TAKAYAMA Kotaro				
Numbering	MEC_DOC75025				

Objectives of class

1)Learns some important methods in signal processing.
2)Provides analytical methods for nonlinear systems and their application to real systems.

Contents of class

[Face to Face] 1st week: Piezoelectric phenomena
[On-demand] 2nd week: Piezoelectric equation
[Face to Face] 3rd week: Analogy between electric and mechanical systems
[On-demand] 4th week: Piezoelectric Vibration I
[Face to Face] 5th week: Piezoelectric Vibration II
Lecturer: Mashimo

(on-demand) 6th week: Mathematical programming and application I
(face to face)　7th week: Mathematical programming and application II
(on-demand) 8th week: Mathematical programming and application III
(face to face)　9th week: Mathematical programming and application IV
(on-demand) 10th week: Mathematical programming and application V
Lecturer: Uchiyama(The above subjects may be changed according to students' requests and backgrounds)

[Face to face] 11th week: Smart agricultural production system
[On-demand] 12th week: Plant measurement techniques and diagnostics I
[On-demand] 13th week: Plant measurement techniques and diagnostics II
[On-demand] 14th week: Plant measurement techniques and diagnostics III
[On-demand] 15th week: Plant measurement techniques and diagnostics IV
Lecturer: Takayama

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Face to face: Regular face to face class
On-demand: You can take the class whenever you want.

Self Preparation and Review

Required to prepare for and review each lecture contents based on handouts provided.

Related subjects

1. Advanced signal measurements engineering
2. Advanced systems engineering

Notes for textbook

Handouts will be provided.

Rader & Gold:chap.5 in Theory and application of digital signal processing (Printice-Hall)

Reference1	**Book title**	Frontiers in Computing Technologies for Manufacturing Applications	**ISBN**	978-1-84628-954-

						5
	Author	Yoshiaki Shimizu, Zhong Zhang, Rafael Batres	**Publisher**	Springer	**Publish year**	2007
Reference2	**Book title**	Nonlinear Control of Engineering Systems: A Lyapunov-Based Approach			**ISBN**	0-8176-4265-X
	Author	W. E. Dixon et al.	**Publisher**	Birkhauser	**Publish year**	2003
Reference3	**Book title**	Nonlinear Systems, 3rd Ed.			**ISBN**	0-13-067389-7
	Author	H. K. Khalil	**Publisher**	Prentice Hall	**Publish year**	2002

Notes for reference
N/A

Goals to be achieved
1)Learn the advanced signal processing methods and knowledge
2)Expected to understand analysis of nonlinear systems.
3)Be able to apply the analytical methods to real nonlinear systems

Evaluation of achievement
The final grade will be determined by report assignments of two lecturers (Each ratio is 100/2 %).

Basically, students are expected to attend all courses.
The credit of this course is given if the score of the above reports is 60% or over.
Grade levels are C (60% – less than 70%), B (70 – less than 80%) and A (80% – less than 90%) and S (90% or over).

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

Details of examination
N/A

Other information
Mashimo
E-mail: mashimo@me.tut.ac.jp
Uchiyama
E-mail: uchiyama@me.tut.ac.jp
Takayama
E-mail: takayama.kotaro.om@tut.jp

Reference URL
N/A

Office hours
Mashimo(Contact by e-mail first.)
Uchiyama(Contact by e-mail first.)
Takayama(Contact by e-mail first.)

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner

Key words

Piezoelectric phenomena, Nonlinear systems, Systems engineering

(D51030100)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D51030100	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S1系教務委員, 教務委員会副委員長 1kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71025				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.
New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.
1) Presentations
In this class, each student will make a presentation to other students of different research fields.
So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.
*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation
Not only D2 students, but also other students are welcome to attend the presentation.
So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.
We will post it on the bulletin board inside the campus.

3) Report you will submit
You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation
Please check the schedule given before the semester begins.

5) Absence from the class
Basically, you have to attend every class.
If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

(*) If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
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4) Schedule of your presentation
Please check the schedule given before the semester begins.

5) Absence from the class
Basically, you have to attend every class.
If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

(*) If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Review each lecture and prepare for the next class with reference to the textbook.

Review each lecture and prepare for the next class with reference to the textbook.

Related subjects

N/A
N/A

Notes for textbook

N/A
N/A

Notes for reference

N/A
N/A

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.
The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90 %) and S(90% or over).
Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Grade levels are C(60% – less than 70%), B(70– less than 80%), A(80% – less than 90 %) and S(90% or over).

Examination

レポートで実施
By Report

Details of examination

N/A
N/A

Other information

Contact the educational affairs division for inquiry.
Contact the educational affairs division for inquiry.

Reference URL

N/A
N/A

Office hours

Before/after the class
Before/after the class

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。
(E)最新の技術や社会環境の変化に対する探究心と持続的学習力
社会，環境，技術等の変化の本質を探求し，生涯にわたって自発的に計画し学習する能力を身につけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniques for problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner.
(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, and the high ability to contribute to the goals of the team as a leader
(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 investigate the nature of change in society, environment and technology, and voluntarily make plans and learn throughout one's life

(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner
(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, and thehigh ability to contribute to the goals of the team as a leader
(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 investigate the nature of change in society, environment and technology, andvoluntarily make plans and learn throughout one's life

Key words

Interdisciplinary Research
Interdisciplinary Research

(D52010020)Seminar on Electrical and Electronic Information Engineering 2[Seminar on Electrical and Electronic Information Engineering 2]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 2[Seminar on Electrical and Electronic Information Engineering 2]				
Schedule number	D52010020	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_DOC71015				

Objectives of class

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

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

N/A

Related subjects

N/A

Notes for textbook

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

Notes for reference

N/A

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

N/A

Other information

N/A

Reference URL

N/A

Office hours

N/A

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
(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
(E) Inquisitive mind and continuous learning skill 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

(D52010030)Seminar on Electrical and Electronic Information Engineering 3[Seminar on Electrical and Electronic Information Engineering 3]

Subject name[English]	Seminar on Electrical and Electronic Information Engineering 3[Seminar on Electrical and Electronic Information Engineering 3]				
Schedule number	D52010030	**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)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_DOC71015				

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

N/A

Related subjects

N/A

Notes for textbook

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

Notes for reference

N/A

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

N/A

Other information

N/A

Reference URL

N/A

Office hours

N/A

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
(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
(E) Inquisitive mind and continuous learning skill 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

(D52010050)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D52010050	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 教務委員会副委員長 2kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71015				

Objectives of class

In this lecture, each student is requested to present its own doctoral research intelligibly for the doctoral students from other departments. By studying various topics in other areas, each student is supposed to acquire the ability to organize various knowledge of different areas to promote its own research and development.

Contents of class

Lecture 1: The vice-chair of the committee of educational affairs give the guidance and instructions for the applicants to enforce this lecture. The students arrange the schedule of the lectures by themselves.

Lecture 2 -- 15:
10 lectures out of 14: Two or three students present their research themes along with the problems and solutions in their activities. Each students prepares a resume of two A4 pages, presents the contents in 20 minutes using presentation software (e.g. powerpoint), and then discusses with doctoral students from other departments (20 minutes).
5 lectures out of 14: Five professors (one for each department) give the lectures on their research topics. The students discuss the interdisciplinary research based on the professor's talk.

When a student presents their research, its supervisor is requested to attend to the class. Thus, the presentation schedule is examined in the committee of educational affairs.

The student presentations are open to faculty members and students. Each student is requested to submit the title and the abstract of the talk by three weeks before the scheduled date, which are publicized in our campus.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

N/A

Related subjects

Specialized and general subjects in each course.

Notes for textbook

N/A

Notes for reference

N/A

Goals to be achieved

To acquire the ability to present the research for the doctoral students from other departments.
To acquire the ability to organize various knowledge of different areas to promote its own research and development.

Evaluation of achievement

The evaluation is given by the supervisor, totally considering the reports submitted by the student. Each student selects one or more presentations from the other's presentations, and writes a report of 1 page (A4) on the relationship to its own theme with the possible feedback to the own theme.
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
N/A

Other information
N/A

Reference URL
N/A

Office hours
N/A

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
(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

Key words

(D52020010)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	D52020010	**Subject area**	Advanced Electrical and Electronic Information Engineering	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎 kyoumu iinkai fukuiintyou, TANAKA Saburo				
Numbering	COM_DOC51005				

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 (October 6, 2021): Introduction, 1st module in e-learning
2nd – 6th week (October 13 – November 17): 2nd – 7th modules in e-learning
Submit the e-learning Certificate to the Educational Affairs Division
7th week: (November 24 – November 30)Discussion with supervisor
8th week: Report (December 1, 2021)

e-learning
1st module: Research Misconduct
2nd module: Ethical Issues in the Management of Data in Engineering Research
3rd module: Responsible Authorship
4th module: Ethical Issues in the Peer Review and Publication of Engineering Research
5th module: Collaborative Research in Engineering Fields
6th module: Whistleblowing and the Obligation to Protect the Public
7th module: Managing Public Research Funds

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students will need to review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

N/A

Reference1	**Book title**	For the sound development of science : the attitude of a conscientious scientist			**ISBN**	978-4-621-08938-5
	Author	edited by Japan Society for the Promotion of Science Editing Committee "For the Sound Development of Science"	**Publisher**	Maruzen	**Publish year**	2015

Notes for reference

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' research specialties.

Evaluation of achievement

[Evaluation method] Report(100%)

[Evaluation 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

N/A

Reference URL

N/A

Office hours

Before/after the class

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性

上級技術者・研究者として社会的・倫理的責任を有し，社会における技術的課題を設定・解決・評価する能力を身につけている。

(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について考える能力を身につけている。

(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; and have the ability to set, solve and evaluate technical issues in society

(A) Personality and outlook with a broad perspective

Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as public welfare

Key words

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

(D52030020)Advanced Electronic Materials 2[Advanced Electronic Materials 2]

Subject name[English]	Advanced Electronic Materials 2[Advanced Electronic Materials 2]				
Schedule number	D52030020	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.3～3	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	松田 厚範, 服部 敏明, 加藤 亮 MATSUDA Atsunori, HATTORI Toshiaki, KATOH Ryo				
Numbering	ELC_DOC72025				

Objectives of class

Learn basic and advanced research fields in materials electronics for photonics, ionics, sensing materials, and so on.

Contents of class

Based on the assignments preliminary provides by professors, lectures will be performed on the basis of students' investigation and class discussion.

Important topics are as follows.

Ionics: Basics and applications of advanced solid electrolytes and electrochemical devices such as Li-ion battery and fuel cells.

Ion recognition reagents: Development of anion recognition reagent by using hydrogen bonding, and Development of moisture sensing in oil

Sensing materials: Basics of advanced functional materials and its applications for sensing methods.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Student must prepare the coming lectures according to advance directives, assignments and distributed documents. They also must engage in the debate and discussion on the topics during classes.

Related subjects

Inorganic chemistry, Physical chemistry, Interface chemistry, Electrochemistry, Materials science for solid-state electronics

Notes for textbook

Papers(resume) will be distributed.

Notes for reference

N/A

Goals to be achieved

Learn following subjects and skill from lectures and discussion:

1. Basics of physical and chemical phenomena concerning materials science for electronics.

2. Presentation skill to explain the above phenomena for bachelor students based on the comprehensive understanding.

Evaluation of achievement

Total point is calculated on the basis of contents of presentations and discussion on the themes given by each professor.

Examination

試験期間中には何も行わない

None during exam period

Details of examination

None during exam period

Other information

N/A

Reference URL

Matsuda：http://ion.ee.tut.ac.jp/
Kato：http://www.electroanal.ee.tut.ac.jp/
Hattori:http://www.electroanal.ee.tut.ac.jp/

Office hours

As needed to corresponding professors by e-mail etc.

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

Key words

実務経験
Materials science for electronics

(D52030030)Advanced Electrical Systems 1[Advanced Electrical Systems 1]

Subject name[English]	Advanced Electrical Systems 1[Advanced Electrical Systems 1]				
Schedule number	D52030030	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	穂積 直裕, 滝川 浩史 HOZUMI Naohiro, TAKIKAWA Hirofumi				
Numbering	ELC_DOC73025				

Objectives of class

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

Contents of class

Sub Course 1
1. Generation and control of various plasmas
2. Characteristics and diagnostics of plasma
3. Applications of functional plasma and trends

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

Self Preparation and Review

Related subjects

Notes for textbook

Materials will be prepared by the lecturers.

Notes for reference

Goals to be achieved

Evaluation of achievement

Marks are based on reports(100%)

Examination

レポートで実施
By Report

Details of examination

By report

Other information

Office, Tel and E-mail:
H. Takikawa: C-311, 0532-44-6727, takikawa@ee.tut.ac.jp
N. Hozumi: C-309, 0532-44-6958, hozumi@ee.tut.ac.jp

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
Key words

(D52030060)Advanced Microelectronics 2[Advanced Microelectronics 2]

Subject name[English]	Advanced Microelectronics 2[Advanced Microelectronics 2]				
Schedule number	D52030060	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Tue.2～2	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	若原　昭浩, 岡田　浩, 河野　剛士, 髙橋　一浩 WAKAHARA Akihiro, OKADA Hiroshi, KAWANO Takeshi, TAKAHASHI Kazuhiro				
Numbering	ELC_DOC74025				

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, 高橋）

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。

授業の進め方は、受講学生の学習履歴や受講学生人数をみて、効果的な学習が進められる形式で行う。
本学の新型コロナウィルス感染拡大防止のための活動基準の変更に伴い、授業内容および成績の評価法に変更が生じる場合があります。

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. MEMS/NEMS technology(Prof. Kawano, Prof. Takahashi)

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.

The class will be conducted so as to achieve effective learning based on the learning history of the students and the number of students taking the class.
If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

特になし

N/A

Related subjects

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

Master's course: Semiconductor physics 1 & 2

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

Master's course: Semiconductor physics 1 & 2

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

特になし
N/A

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、基本的な半導体デバイスの動作原理を修士課程学生に説明できること
2. 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
3. 与えられたトピックスを調査し、講義できること

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

Evaluation of achievement

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-306 okada[at]las.tut.ac.jp
河野剛士:C-603 kawano[at]ee.tut.ac.jp
高橋一浩:C-606 takahashi[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-306 okada[at]las.tut.ac.jp
Takeshi Kawano:C-603 kawano[at]ee.tut.ac.jp
Kazuhiro Takahashi:C-606 takahashi[at]ee.tut.ac.jp

Reference URL

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

Office hours

メール用でアポを取ってください
Take an appointment by e-mail

Relations to attainment objectives of learning and education

（C）高度な知識を統合的・発展的に活用できる実践力・創造力
電気・電子情報工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる
能力を身につけている。

(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

Key words

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

(D52030080)Advanced Information and Communication Systems 2[Advanced Information and Communication Systems 2]

Subject name[English]	Advanced Information and Communication Systems 2[Advanced Information and Communication Systems 2]				
Schedule number	D52030080	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	市川 周一, 田村 昌也 ICHIKAWA Shuichi, TAMURA Masaya				
Numbering	ELC_DOC75025				

Objectives of class

This lecture introduces some advanced topics on (1) computer system engineering and (2) electromagnetic wave system. The details are given below.

Contents of class

The topics of item (1) include the following items:
1. Parallel and High-performance computing,
2. Parallel and High-performance computer architecture,
3. Custom computing circuit, special-purpose computing system.

The topics of item (2) include the following items:
1. Design of microwave filter used in wireless communications,
2. Wireless power transfer system based on filter theory,
3. Underwater wireless power transfer system.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

It is strongly recommended to prepare the lecture, e.g., to read the course materials and references before attending the corresponding lecture. Average preparation time is 90 minutes.
It is also recommended to review after the lecture. Average review time is 90 minutes.
The course materials and references will be shown by the lecturer whenever necessary.

Related subjects

The students who register for this lecture must have studied the Advanced Electronic Information System 1 and 2 (Ichikawa, Tamura) in master course program, or its equivalent.
All courses taken at other universities must be approved by the lecturers before registering for this course.

Notes for textbook

Course materials and references are shown by lecturers.

Notes for reference

N/A

Goals to be achieved

The students are required to obtain the advanced knowledge on the above-mentioned items for their research activities in doctoral program.

Evaluation of achievement

There will be assignments for the topics shown above; course grades will be the average of these assignments.
Attendance to all lectures is compulsory; the absence without permission will result in a substantial penalty.

Examination

レポートで実施
By Report

Details of examination

N/A

Other information

Ichikawa, Room C-404, ichikawa@tut.jp

Tamura, Room C-405, tamura@ee.tut.ac.jp

Reference URL

Ichikawa http://www.ccs.ee.tut.ac.jp/~ichikawa/index-e.html
Tamura http://www.comm.ee.tut.ac.jp/em/index_en.html

Office hours

Please make an appointment via e-mail.

Relations to attainment objectives of learning and education

電気・電子情報工学専攻
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
電気・電子情報工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

Graduate Progaram of Engineering of Electrical and ElectronicInformation Engineering for Doctoral Degree
(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 toutilize such knowledge for problem solving in an integrated manner

Key words

(1) computer system, high performance computing (2) wireless power transfer, electromagnetic wave engineering

(D52030090)Methodology of R & D[Methodology of R & D]

Subject name[English]	Methodology of R & D[Methodology of R & D]				
Schedule number	D52030090	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S2系教務委員 2kei kyomu Iin-S				
Numbering	ELC_DOC78025				

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 doctor 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

N/A

Related subjects

N/A

Notes for textbook

Reference and material will be available from the supervisor.

Notes for reference

N/A

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

N/A

Other information

N/A

Reference URL

N/A

Office hours

N/A

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

Key words

(D52030100)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D52030100	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S2系教務委員, 教務委員会副委員長 2kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71025				

Objectives of class

In this lecture, each student is requested to present its own doctoral research intelligibly for the doctoral students from other departments. By studying various topics in other areas, each student is supposed to acquire the ability to organize various knowledge of different areas to promote its own research and development.

Contents of class

Lecture 1: The vice-chair of the committee of educational affairs give the guidance and instructions for the applicants to enforce this lecture. The students arrange the schedule of the lectures by themselves.

Lecture 2 -- 15:
10 lectures out of 14: Two or three students present their research themes along with the problems and solutions in their activities. Each students prepares a resume of two A4 pages, presents the contents in 20 minutes using presentation software (e.g. powerpoint), and then discusses with doctoral students from other departments (20 minutes).
5 lectures out of 14: Five professors (one for each department) give the lectures on their research topics. The students discuss the interdisciplinary research based on the professor's talk.

When a student presents their research, its supervisor is requested to attend to the class. Thus, the presentation schedule is examined in the committee of educational affairs.

The student presentations are open to faculty members and students. Each student is requested to submit the title and the abstract of the talk by three weeks before the scheduled date, which are publicized in our campus.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

N/A

Related subjects

Specialized and general subjects in each course.

Notes for textbook

N/A

Notes for reference

N/A

Goals to be achieved

To acquire the ability to present the research for the doctoral students from other departments.
To acquire the ability to organize various knowledge of different areas to promote its own research and development.

Evaluation of achievement

The evaluation is given by the supervisor, totally considering the reports submitted by the student. Each student selects one or more presentations from the other's presentations, and writes a report of 1 page (A4) on the relationship to its own theme with the possible feedback to the own theme.
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
N/A

Other information
N/A

Reference URL
N/A

Office hours
N/A

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
(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

Key words

(D53010010)Seminar on Computer Science and Engineering 1[Seminar on Computer Science and Engineering 1]

Subject name[English]	Seminar on Computer Science and Engineering 1[Seminar on Computer Science and Engineering 1]				
Schedule number	D53010010	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering	CMP_DOC71015				

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。

The score is assigned by the supervisor considering autonomy for the discovery and understanding of technical information, the method of the description, the answer to the question determines, and the participation to the discussion.

S: more than or equal to 90, A: more than or equal to 80, B: more than or equal to 60, C: more than or equal to 60.

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
Key words

(D53010020)Seminar on Computer Science and Engineering 2[Seminar on Computer Science and Engineering 2]

Subject name[English]	Seminar on Computer Science and Engineering 2[Seminar on Computer Science and Engineering 2]				
Schedule number	D53010020	**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)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S3系教務委員 3kei kyomu Iin-S				
Numbering	CMP_DOC71015				

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。

The score is assigned by the supervisor considering autonomy for the discovery and understanding of technical information, the method of the description, the answer to the question determines, and the participation to the discussion.

S:more than or equal to 90, A:more than or equal to 80, B:more than or equal to 70, C:more than or equal to 60

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
Key words

(D53010050)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D53010050	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S3系教務委員, 教務委員会副委員長 3kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71015				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

Self Preparation and Review

Consult with your advisor.

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

N/A

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Course Evaluation
Evaluation is based on three short papers (100 points).
S: total points of reports, 90 or higher (out of 100 points).
A: total points of reports, 80 or higher (out of 100 points).
B: total points of reports, 70 or higher (out of 100 points).
C: total points of reports, 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

Your supervisor will evaluate your presentation and your reports.

Other information

N/A

Reference URL

N/A

Office hours

Your supervisor will evaluate your presentation and your reports.

Relations to attainment objectives of learning and education

Key words

(D53020010)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	D53020010	**Subject area**	Advanced Computer Science and Engineering	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎 kyoumu iinkai fukuiintyou, TANAKA Saburo				
Numbering	COM_DOC51005				

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 (October 6, 2021): Introduction, 1st module in e-learning
2nd – 6th week (October 13 – November 17): 2nd – 7th modules in e-learning
Submit the e-learning Certificate to the Educational Affairs Division
7th week: (November 24 – November 30)Discussion with supervisor
8th week: Report (December 1, 2021)

e-learning
1st module: Research Misconduct
2nd module: Ethical Issues in the Management of Data in Engineering Research
3rd module: Responsible Authorship
4th module: Ethical Issues in the Peer Review and Publication of Engineering Research
5th module: Collaborative Research in Engineering Fields
6th module: Whistleblowing and the Obligation to Protect the Public
7th module: Managing Public Research Funds

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students will need to review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

N/A

Reference1	**Book title**	For the sound development of science : the attitude of a conscientious scientist			**ISBN**	978-4-621-08938-5
	Author	edited by Japan Society for the Promotion of Science Editing Committee "For the Sound Development of Science"	**Publisher**	Maruzen	**Publish year**	2015

Notes for reference

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' research specialties.

Evaluation of achievement

[Evaluation method] Report(100%)

[Evaluation 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

N/A

Reference URL

N/A

Office hours

Before/after the class

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性

上級技術者・研究者として社会的・倫理的責任を有し，社会における技術的課題を設定・解決・評価する能力を身につけている。

(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について考える能力を身につけている。

(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; and have the ability to set, solve and evaluate technical issues in society

(A) Personality and outlook with a broad perspective

Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as public welfare

Key words

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

(D53030210)Computer Network Engineering 1[Computer Network Engineering 1]

Subject name[English]	Computer Network Engineering 1[Computer Network Engineering 1]				
Schedule number	D53030210	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Wed.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	梅村　恭司 UMEMURA Kyoji				
Numbering	CMP_DOC72325				

Objectives of class

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

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

Contents of class

1. Link Layer
2. Internet Protocol
3. Address Resolution Protocol
4. Internet Control Message Protocol
5. IP routing and Dynamic Routing Protocol
6. Transmission Control Protocol
7. User Datagram Protocol and Multicasting

Class id of Google Classroom will be available from or KYOMU JOHO SYSTEM.
URL of Google Meet is that of Google Classroom

1. (remote simultaneous interactiv) Link Layer
2. (remote simultaneous interactiv) Internet Protocol
3. (remote simultaneous interactiv) Address Resolution Protocol
4. (remote simultaneous interactiv) Internet Control Message Protocol
5. (remote simultaneous interactiv) IP routing and Dynamic Routing Protocol
6. (remote simultaneous interactiv) Transmission Control Protocol
7. (remote simultaneous interactiv) User Datagram Protocol and Multicasting

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change

(If there is any changes about a class schedule, it will be informed via Google Classroom

--

By Individual interactive Examination.

Self Preparation and Review

Related subjects

The basic knowledge about the structure of client/server programs is required.

The basic knowledge about the structure of client/server programs is required.

Textbook1	**Book title**	TCP/IP Illustrated Volume. 1, The Protocols,	**ISBN**	

	Author	W. Richard Stevens	Publisher	Addison-wesley	Publish year	

Notes for textbook

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

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

Required part of this book will be accessible through the material of lecture. You need not prepare the book.

Notes for reference

Goals to be achieved

The goal is to understand precisely the structure of internet protocol with which computer network works.
The goal is to understand precisely the structure of internet protocol with which computer network works.

Evaluation of achievement

By Individual interactive Examination.

By Individual interactive Examination.

Examination

定期試験を実施(対面)
Examination(Face to Face)

Details of examination

Other information

C－304 umemura@tut.jp

C－304 umemura@tut.jp

Reference URL

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

Office hours

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

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

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

Computer Network, Distributed Systems

Computer Network, Distributed Systems

(D53030220)Computer Network Engineering 2[Computer Network Engineering 2]

Subject name[English]	Computer Network Engineering 2[Computer Network Engineering 2]				
Schedule number	D53030220	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Wed.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	大村　廉 OMURA Ren				
Numbering	CMP_DOC72325				

Objectives of class

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

Contents of class

The 1st and 2nd weeks; Concepts of Distributed Systems (Face to face)
The 3rd week; Synchronization(Face to face)
The 4th and 5th weeks; Consistency(Face to face)
The 6th, 7th, and 8th weeks; Fault tolerance(Face to face)

Evaluation will be done by an assignment announced in a class.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Coronavirus, the course content and evaluation of achievement are subject to change.
If there are any changes to a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

To enhance a learning effect, students are encouraged to refer to the reference book, "Distributed Systems: Principles and Paradigms (2nd Edition)" and to search some keywords in the book on the Internet to find practical examples. To prepare for and review the lecture for around 90 minutes each.

Related subjects

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

Notes for textbook

The materials referenced in the class will be able to download via Google Classroom or pass out in the class.

Reference1	**Book title**	Distributed systems : principles and paradigms			**ISBN**	978-0132392273
	Author	Andrew S. Tanenbaum, Maarten van Steen	**Publisher**	Pearson Prentice Hall	**Publish year**	2007

Notes for reference

Some other related materials, such as books, videos, and web pages, are introduced in the class.

Goals to be achieved

The aim of this class is to understand;
(1) the basic methods and concepts of synchronization in distributed systems;
(2) the concepts and variations of consistency in distributed systems;

(3) the basic concepts and methods of fault tolerance in distributed systems;
(4) the basic concepts of security in distributed systems;
(5) and some practical examples of distributed systems.

Evaluation of achievement

The achievement of students is evaluated by a report assignment. (If the evaluation method is changed, it is announced in the class.)
S: 90 and over
A: 80 and over
B: 70 and over
C: 60 and over

Examination

レポートで実施
By Report

Details of examination

A report related to distributed systems is assigned. (If the evaluation method is changed, it is announced in the class.)

Other information

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

Reference URL

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

Office hours

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

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

Distributed System, Computer Network, Operating System
Distributed System, Computer Network, Operating System

(D53030370)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D53030370	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S3系教務委員, 教務委員会副委員長 3kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71025				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

Self Preparation and Review

Consult with your advisor.

Related subjects

Consult with your advisor.

Notes for textbook

Consult with your advisor.

Notes for reference

N/A

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Course Evaluation
Evaluation is based on three short papers (100 points).
S: total points of reports, 90 or higher (out of 100 points).
A: total points of reports, 80 or higher (out of 100 points).
B: total points of reports, 70 or higher (out of 100 points).
C: total points of reports, 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

Your supervisor will evaluate your presentation and your reports.

Other information

N/A

Reference URL

N/A

Office hours

Your supervisor will evaluate your presentation and your reports.

Relations to attainment objectives of learning and education

Key words

(D53030380)Advanced Data Science and Analysis 1[Advanced Data Science and Analysis 1]

Subject name[English]	Advanced Data Science and Analysis 1[Advanced Data Science and Analysis 1]				
Schedule number	D53030380	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Mon.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	秋葉 友良 AKIBA Tomoyoshi				
Numbering	CMP_DOC72525				

Objectives of class

Important topics on statistical natural language processing will be discussed by focusing on statistical machine translation.

Contents of class

Week 1: (face-to-face) Introduction
Week 2: (on-demand) Lecture (Basic of Probability and Statistics, Recent Trends in Machine Translation)
Week 3: (on-demand) Presentation & Discussion (Statistical Method for Machine Translation)
Week 4: (on-demand) Presentation & Discussion (Language Models)
Week 5: (on-demand) Presentation & Discussion (Translation Models)
Week 6: (on-demand) Presentation & Discussion (Parameter Estimation)
Week 7: (on-demand) Presentation & Discussion (EM Algorithm)
Week 8: (on-demand) Presentation & Discussion (Advanced methods in SMT)

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Students are requested to read the content written in the textbook before the class. (90 minutes)
Each student is requested to make her/his own presentation videos several times in the course. (2 to 5 hours each)
Students are encouraged to have a discussion on the presentation video posted by other students. (90 minutes)

Related subjects

Probability theory, Information theory, Formal language theory

Notes for textbook

Resumes will be provided, which are based on:
・Kevin Knight
A Statistical MT Tutorial Workbook
・Seiichi Nakagawa et al.
Spoken Language Processing and Natural Language Processing

Reference1	**Book title**	Statistical Machine Translation			**ISBN**	978-0521874151
	Author	Philipp Koehn	**Publisher**	Cambridge University Press	**Publish year**	2010
Reference2	**Book title**	A Statistical MT Tutorial Workbook			**ISBN**	
	Author	Kevin Knight	**Publisher**		**Publish year**	

Notes for reference

N/A

Goals to be achieved

Basics: Understand the basic concepts of natural language processing
Natural Language Processing: Understand the role of language resources, language and translation models, word alignments,

and parameter estimation methods,
Applications: Understand statistical machine translation system.

Evaluation of achievement

Marks are based on the submitted materials (presentation) and the activity in the class (100%).

Examination

授業を実施

Regular Class

Details of examination

N/A

Other information

Tomoyosi Akiba: C-505, 44-6758, akiba@cs.tut.ac.jp

Reference URL

N/A

Office hours

16:25-17:40, Tuesday

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.
(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.Havesophisticated ability as a leader to contribute for the achievement the goal of team.

Key words

spoken language processing, natural language processing, human language technology

(D53030390)Advanced Robotic Perception and Human-Robot Interaction 1[Advanced Robotic Perception and Human-Robot Interaction 1]

Subject name[English]	Advanced Robotic Perception and Human-Robot Interaction 1[Advanced Robotic Perception and Human-Robot Interaction 1]				
Schedule number	D53030390	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	三浦 純 MIURA Jun				
Numbering	CMP_DOC73225				

Objectives of class

Fundamental and advanced issues in intelligent robotics will be discussed. Topics included are: statistical sensor fusion with Bayes filters, object tracking and identification, robotic mapping and localization, observation planning, human detection and identification, and task-oriented human-robot interaction.

Contents of class

Week 1: Introduction, probability basics, and sensor fusion by Bayesian inference.(face-to-face)
Week 2: Object tracking by Bayesian filters.(on-demand)
Week 3: Mobile robot localization.(on-demand)
Week 4: Mapping and SLAM (simultaneous localization and mapping)(on-demand)
Week 5: Observation planning.(on-demand)
Week 6: Human detection and identification.(on-demand)
Week 7: Task-oriented human-robot interaction.(on-demand)
Week 8: Presentation of assignment (face-to-face)

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students are encouraged to regularly review and prepare for the lecture using provided materials (for about 90 minutes each).

Related subjects

Fundamental knowledge of linear algebra and probability theory is useful.

Notes for textbook

Handouts with video explanation will be provided. The main reference is shown below.

Reference1	**Book title**	Probabilistic robotics			**ISBN**	978-0262201629
	Author	Sebastian Thrun, Wolfram Burgard, Dieter Fox	**Publisher**	MIT Press	**Publish year**	2006

Notes for reference

N/A

Goals to be achieved

To understand the fundamental and advanced issues in intelligent robotics, especially in robotic perception and human-robot interaction, including:
(1) statistical data fusion
(2) mobile robot localization and mapping
(3) perception and planning for human-robot interaction

Evaluation of achievement

Students who attend all classes will be evaluated as follows:
S: Achieved all goals, and obtained total points of the final assignment is 90 or higher (out of 100 points).
A: Achieved all goals, and obtained total points of the final assignment is 80 or higher (out of 100 points).
B: Achieved 80% of goals, and obtained total points of the final assignment is 70 or higher (out of 100 points).
C: Achieved 60% of goals, and obtained total points of the final assignment is 60 or higher (out of 100 points).

Examination レポートで実施 By Report
Details of examination N/A
Other information Contact: Room C-604, Ext. 6773, Email: jun.miura@tut.jp (Jun Miura)
Reference URL All materials are delivered by Google Classroom. The class code is: y4umxsb
Office hours Make an appointment beforehand by email.
Relations to attainment objectives of learning and education
Key words robotics, sensor fusion, robotic perception, human-robot interaction

(D53030400)Advanced Robotic Perception and Human-Robot Interaction 2[Advanced Robotic Perception and Human-Robot Interaction 2]

Subject name[English]	Advanced Robotic Perception and Human-Robot Interaction 2[Advanced Robotic Perception and Human-Robot Interaction 2]				
Schedule number	D53030400	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	大島　直樹, 大村　廉 OSHIMA Naoki, OMURA Ren				
Numbering	CMP_DOC73225				

Objectives of class

人とロボットとの情動的なコミュニケーションを実現するための開発ツールやプラットフォームについて、実際のシステム構築に取り組みながら修得する。

The aim of this course is to utilize tools and platforms to construct human-robot affective communication in a real-world scenario.

Contents of class

(オンデマンド)第 1 週: インタラクティブに振る舞う将来のソーシャルロボット(担当: 大島)
(オンデマンド)第 2-3 週: ソーシャルロボット構築のための、マルチモーダル処理を用いた会話生成システム(担当: 大島)
(オンデマンド)第 4 週: ソーシャルロボット制御のためのネットワークサービス(担当: 大村)
(オンデマンド)第 5 週: ロボットのボディーを物理的に出力する 3D プリンタ技術(担当: 大島)
(対面)第 6-7.5 週: 最終課題(未来のソーシャルロボットの提案、試作に向けたプロジェクトワーク)および評価ポイントの解説(担当: 大島)

本学の新型コロナウィルス感染拡大防止のための活動基準の変更に伴い、授業内容および成績の評価法に変更が生じる場合があります。
授業実施形態が変更になる場合は, GoogleClassroom または教務情報システムより通知します。

(オンデマンド)・・Google Classroom に講義資料を掲載する。
(対面)・・講義室にて対面授業を行う。
Week 1: Building interactive sociable robots of the future, On-demand (Dr. Ohshima)
Week 2-3: Real-time multimodal processing for constructing sociable robot's conversation system, On-demand (Dr. Ohshima)
Week 4: Network services for sociable robot manipulation, On-demand (Dr. Ohmura)
Week 5: 3D robot printing technology, On-demand (Dr. Ohshima)
Week 6-7.5: Final assignment(project work: proposing and prototyping sociable robots of the future), evaluation and review, Face to face (Dr. Ohshima)

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

On-demand (You can take the class whenever you want.)
Face to face (Regular face to face class)

Self Preparation and Review

授業前までに指定された資料を熟読すること(予習 45 分)。授業後はその回の講義内容を復習すること(復習 45 分)。

Reviewing and preparing for the lecture using provided materials are desirable. To prepare for and review the lecture for around 45 minutes each.

Related subjects

特になし
N/A

Notes for textbook

ハンドアウトを用意します。主な参考書は下記の通り。

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

Reference1	**Book title**	Human-robot interaction : an introduction			**ISBN**	978-1108735407
	Author	Christoph Bartneck ... [et al.]	**Publisher**	Cambridge University Press	**Publish year**	2020

Notes for reference
特になし
N/A

Goals to be achieved
インタラクティブに振る舞うソーシャルなロボットの開発に必要な基礎技術やその応用・課題等について理解を得ること。
1) 与えられた目的に従って適切に動作するインタラクティブロボットを構築することができる
2) 機能と特徴、目的に合致したロボットデザインを提案できる
3) ソーシャルロボットの近年の動向や新規点を理解する
Understanding following fundamental and advanced issues for building interactive sociable robots.
1) Interactivity: Constructing interactive robot acting appropriately according to its purpose
2) Design: proposing new design to match its ability, features, and purpose
3) Novelty: understanding recent trends of interactive social robots

Evaluation of achievement
レポート(50%)と課題など(50%)の内容で評価する。
S: レポート・課題の合計点(100 点満点)が 90 点以上
A: レポート・課題の合計点(100 点満点)が 80 点以上
B: レポート・課題の合計点(100 点満点)が 70 点以上
C: レポート・課題の合計点(100 点満点)が 60 点以上
The grade will be determined by the class assignments and the final report (the total points are 100).
S: the total points are 90 or higher.
A: the total points are 80 or higher.
B: the total points are 70 or higher.
C: the total points are 60 or higher.

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

Details of examination
特になし
N/A

Other information
特になし
N/A

Reference URL
特になし
N/A

Office hours
火曜日、15:00～16:00。ただし、事前にメール(ohshima@eiiris.tut.ac.jp)でアポイントをとること。メールでの問い合わせはいつでも良い。
Tuesday, 15:00-16:00. Make an appointment beforehand by email. Students are welcome to send an email asking about the course at any time. E-mail: ohshima@eiiris.tut.ac.jp

Relations to attainment objectives of learning and education

Key words
ロボット、デザイン工学、コミュニケーション
robot, design engineering, communication

(D53030410)Advanced Data Science and Analysis 2[Advanced Data Science and Analysis 2]

Subject name[English]	Advanced Data Science and Analysis 2[Advanced Data Science and Analysis 2]				
Schedule number	D53030410	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Mon.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	青野 雅樹, 栗山 繁 AONO Masaki, KURIYAMA Shigeru				
Numbering	CMP_DOC72325				

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、目的に応じた視覚的なデータ分析のワークフローを設計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 the design methodology of developing data exploration tools by efficiently and effectively visualizing huge size or dimension of dataset. Practical skill of developing the workflow of visual data analytics is learned through the exercises.

Contents of class

(オンデマンド)第1週目:情報可視化の導入と概要説明
(オンデマンド)第2週目:相関の可視化1(多変量データ)
(オンデマンド)第3週目:構造の可視化(木構造・ネットワーク)
(オンデマンド)第4週目:相関の可視化2(Glyph 表示)
(オンデマンド)第5週目:テキスト・変動の可視化と対話操作
(オンデマンド)第6週目:ワークフローの設計
(対面)第7+0.5 週目:制作課題発表
本学の新型コロナウィルス感染拡大防止のための活動基準の変更に伴い、授業内容および成績の評価法に変更が生じる場合があります。
(On-demand) Week 1. Introduction and overview of information visualization
(On-demand) Week 2. Correlation visualization of multivariate data
(On-demand) Week 3. Relation visualization with tree and network representation
(On-demand) Week 4. Visualization of correlation using glyph
(On-demand) Week 5. Visualization of textual information and time-variation, and interactions
(On-demand) Week 6. Design of workflow
(Face to face) Week 7+0.5: Presentation of exercise
If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

予習:Google Classroom 上に公開される電子テキストを事前に熟読すること。(40 分)
復習;Google Classroom 上に公開される解答例を参照すること。(20 分)
To enhance a learning effect, students are encouraged to read a textbook supplied in Google Classroom for around 40 minutes. Students are encouraged to refer to answer samples supplied in Google Classroom for around 20 minutes.

Related subjects

数値解析, 多変量解析, データマイニング特論
Numerical analysis, Multivariate analysis, Advanced Data Mining

Notes for textbook

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

Notes for reference

特になし
N／A

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、データの性質を考慮して最適な可視化ワークフローを設計できる技能を習得する
The goal of this class is to teach design methodology for efficiently and effectively visualizing huge size of multi-dimensional dataset, and to obtain the skill of designing the workflow of visual data analytics by considering the property of the data.

Evaluation of achievement

レポート課題の合計 100 点で採点する。
S:達成目標をすべて達成しており，かつレポート課題の合計点（100 点満点）が 90 点以上
A:達成目標を 90%達成しており，かつレポート課題の合計点（100 点満点）が 80 点以上
B:達成目標を 75%達成しており，かつレポート課題の合計点（100 点満点）が 70 点以上
C:達成目標を 60%達成しており，かつレポート課題の合計点（100 点満点）が 60 点以上
The score is calculated by the Report(Exercise) of the total of 100 points
S: 90 or more, A: 80 or more, B: 70 or more, C: 60 or more

Examination
レポートで実施
By Report

Details of examination
特になし
N／A

Other information
特になし
N／A

Reference URL
特になし
N／A

Office hours
随時だが、電子メールで予約をとること。
Anytime, but requires reservation by E-mail.

Relations to attainment objectives of learning and education

情報・知能工学専攻
（C）高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

Graduate Program of Computer Science and Engineering for Doctoral Degree
(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words
情報検索、情報可視化、ビジュアル情報処理
Information visualization, Visual data analytics, Visual information processing

(D53030430)Advanced 3D Vision Computation 1[Advanced 3D Vision Computation 1]

Subject name[English]	Advanced 3D Vision Computation 1[Advanced 3D Vision Computation 1]				
Schedule number	D53030430	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	金澤 靖 KANAZAWA Yasushi				
Numbering	CMP_DOC72525				

Objectives of class

This course involves fundamentals and advanced issues on 3D reconstruction from images.

This course involves fundamentals and advanced issues on 3D reconstruction from images.

Contents of class

All lectures will be done by "remote simultaneous interactive" and "on-demand".
Each "on-demand" lecture material will be available after the corresponding on-line lecture.

1. Introduction and Projective Geometry
2. Epipolar Geometry
3. 3D reconstruction from Two Views
4. Affine Projection
5. Uncalibrated Stereo
6. Structure from Motion
7. Robust Estimation in Computer Vision
8. Experiment and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

All lectures will be done by "remote simultaneous interactive" and "on-demand".
Each "on-demand" lecture material will be available after the corresponding on-line lecture.

1. Introduction and Projective Geometry
2. Epipolar Geometry
3. 3D reconstruction from Two Views
4. Affine Projection
5. Uncalibrated Stereo
6. Structure from Motion
7. Robust Estimation in Computer Vision
8. Experiment and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Since the handouts are available via web page beforehand, please read the handouts and the corresponding part on reference books.

Since the handouts are available via web page beforehand, please read the handouts and the corresponding part on reference books.

Related subjects

N/A

N/A

Notes for textbook

Handouts will be prepared.

Handouts will be prepared.

Reference1	**Book title**	Guide to 3D vision computation : geometric analysis and implementation			**ISBN**	978-3319484921
	Author	Kenichi Kanatani, Yasuyuki Sugaya, Yasushi Kanazawa	**Publisher**	Springer International Publishing AG	**Publish year**	2016
Reference2	**Book title**	Multiple view geometry in computer vision			**ISBN**	978-0521540513
	Author	Richard Hartley, Andrew Zisserman	**Publisher**	Cambridge University Press	**Publish year**	2003

Notes for reference

N/A

N/A

Goals to be achieved

The goals of this course are to

(1) Understand and explain the basic knowledge of projective geometry.
(2) Understand and explain the epipolar geometry.
(3) Understand and explain the basic theory of 3-D reconstruction from images.
(4) Understand and explain the basic knowledge of robust estimation.
(5) Understand and explain the basic method of image matching.

The goals of this course are to

(1) Understand and explain the basic knowledge of projective geometry.
(2) Understand and explain the epipolar geometry.
(3) Understand and explain the basic theory of 3-D reconstruction from images.
(4) Understand and explain the basic knowledge of robust estimation.
(5) Understand and explain the basic method of image matching.

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

N/A

N/A

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

N/A

N/A

Office hours

Anytime. Please make an appointment beforehand by E-mail.

Anytime. Please make an appointment beforehand by E-mail.

Relations to attainment objectives of learning and education

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

3D reconstruction, computer vision

3D reconstruction, computer vision

(D53030440)Advanced 3D Vision Computation 2[Advanced 3D Vision Computation 2]

Subject name[English]	Advanced 3D Vision Computation 2[Advanced 3D Vision Computation 2]				
Schedule number	D53030440	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	菅谷 保之 SUGAYA Yasuyuki				
Numbering	CMP_DOC72525				

Objectives of class

このコースではコンピュータビジョン技術を用いたカメラ校正手法と、AR マーカー、円形マーカー、自然特徴点や直線特徴を用いた AR アプリケーションについて解説する。そして、これらの技術を用いた AR アプリケーションを実際に開発して議論する。

This course will introduce camera calibration methods and AR applications with various markers, including a famous AR marker, a circular marker, and natural points and lines features. Students develop an AR application based on the studied knowledge and discuss the performance of it.

Contents of class

1. カメラの射影、カメラ校正の基礎
2. AR アプリケーション
3. 矩形マーカーを用いたカメラの位置推定、円形マーカーを用いたカメラの位置推定
4. 実験と議論1
5. 自然特徴点を用いたカメラの位置推定
6. 直線特徴を用いたカメラの位置推定
7. 実験と議論2
8. 実験と議論3

1. Introduction and camera projection and Fundamental of camera calibration
2. AR applications
3. Camera pose estimation by a rectangular marker and Camera pose estimation by a circular maker
4. Experiment and discussion
5. Camera pose estimation by 2-D textures
6. Camera pose estimation by lines
7. Experiment and discussion
8. Experiment and discussion

Self Preparation and Review

The handouts are available via web page(google classroom) beforehand.
The handouts are available via web page(google classroom) 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
特になし
N/A

Goals to be achieved
Understanding of the fundamentals and advanced issues on image processing and computer vision including:
- camera projection
- camera calibration from various features
- AR applications
Understanding of the fundamentals and advanced issues on image processing and computer vision including:
- camera projection
- camera calibration from various features
- AR applications

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
特になし
N/A

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
Google classroom
Google classroom

Office hours
week day
Please send an appointment e-mail in advance.
week day
Please send an appointment e-mail 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 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、カメラ校正、AR アプリケーション
computer vision, camera calibration, AR application

(D53030460)Complex and Intelligent Systems[Complex and Intelligent Systems]

Subject name[English]	Complex and Intelligent Systems[Complex and Intelligent Systems]				
Schedule number	D53030460	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.5～5	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	石田 好輝 ISHIDA Yoshiteru				
Numbering	CMP_DOC73125				

Objectives of class

Focusing on: Matching Automaton as a modeling and design framework
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

(Face to Face) 1st week: Introduction on Self-Action model
(Face to Face) 2nd week: Matching Automaton
(on-demand) 3rd week: Classification of Stable Marriage Problem (chap. 3)
(on-demand) 4th week: Visualization of Stable Marriage Problem (chap. 4)
(on-demand) 5th week: Discrete Modeling of Visual Recognition (chap. 5)
(on-demand) 6th week: Discrete Modeling of Auditory Recognition (chap. 6)
(Face to Face) 7th week: Design by Matching Automaton (chap.7-10)

Self Preparation and Review

Related subjects

Notes for textbook

No textbook. References other than below will be suggested at the first class.
Roth, A.E., Sotomayor, M.A.O.: Two-sided matching: A study in game-theoretic modeling and analysis. vol. 18. Cambridge University Press, (1992);
Gale, D., Shapley, L.S.: College admissions and the stability of marriage. American mathematical monthly, 9-15 (1962);
Gusfield, D., Irving, R.W.: The stable marriage problem: structure and algorithms. MIT press, (1989);
Ishida, Y.: Immunity-Based Systems, Springer (2004);
Ishida, Y : Self-Repair Networks, Springer (2015);
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%)

Course Evaluation
Evaluation is based on class performance(presentations) and reports (100 points).
S: total points of reports and presentations, 90 or higher (out of 100 points).
A: total points of reports and presentations, 80 or higher (out of 100 points).
B: total points of reports and presentations, 70 or higher (out of 100 points).
C: total points of reports and presentations, 60 or higher (out of 100 points).

Examination

その他
Other

Details of examination

Other information
Room F-504, Ext. 6895

Reference URL

Office hours
Tuesday 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, understanding the methodology of research, creating original technology, and integrating all knowledges organically

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

(D53030470)Advanced Human Sensation and Perception 1[Advanced Human Sensation and Perception 1]

Subject name[English]	Advanced Human Sensation and Perception 1[Advanced Human Sensation and Perception 1]				
Schedule number	D53030470	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	中内 茂樹 NAKAUCHI Shigeki				
Numbering	CMP_DOC73025				

Objectives of class

This course is designed to introduce you to the scientific study of human nature. You will learn why and how scientists ask question about the sensation and perception and the relation of brain and behavior.You will also learn about the research methods to measure the perception and cognition used in the field of psychology and cognitive science.Finally, you will be able to create your own experiments using the ‘OpenSesame’, worldwide well-known software for creating experiments for psychology, cognitive science, neuroscience and experimental economics.

This course is designed to introduce you to the scientific study of human nature. You will learn why and how scientists ask question about the sensation and perception and the relation of brain and behavior.You will also learn about the research methods to measure the perception and cognition used in the field of psychology and cognitive science.Finally, you will be able to create your own experiments using the ‘OpenSesame’, worldwide well-known software for creating experiments for psychology, cognitive science, neuroscience and experimental economics.

Contents of class

1. [face-to-face or remote] Introduction to “Science of Human Sensation and Perception”
2. [on-demand] Video (MIT open courseware) and short quiz (assignment)
3. [face-to-face or remote] Measuring Perception – research methodology –
4. [on-demand] Short quiz and Online experiment (assignment)
5. [face-to-face or remote] Workshop for creating experiments using ”OpenSesame”
6. [on-demand] Perform experiment and analyze your own data (assignment)
7. [on-demand] Perform experiment and analyze your own data (assignment)
8. [face-to-face or remote] Wrap up the course

Note: If there is any changes about a class schedule, it will be informed on Google Classroom or KYOMU JOHO SYSTEM.

1. [face-to-face or remote] Introduction to “Science of Human Sensation and Perception”
2. [on-demand] Video (MIT open courseware) and short quiz (assignment)
3. [face-to-face or remote] Measuring Perception – research methodology –
4. [on-demand] Short quiz and Online experiment (assignment)
5. [face-to-face or remote] Workshop for creating experiments using ”OpenSesame”
6. [on-demand] Perform experiment and analyze your own data (assignment)
7. [on-demand] Perform experiment and analyze your own data (assignment)
8. [face-to-face or remote] Wrap up the course

Note: If there is any changes about a class schedule, it will be informed on Google Classroom or KYOMU JOHO SYSTEM.

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. In order to increase the learning effect, it is desirable to prepare and review the class content (about 90 minutes for each) by referring to the relevant sections of the textbook.

Read the documents provided before each lecture. Review the lectures in consultation with the references and other resources such as the Internet. In order to increase the learning effect, it is desirable to prepare and review the class content (about 90 minutes for each) by referring to the relevant sections of the textbook.

Related subjects

N/A

N/A

Notes for textbook

Documents (pdfs of the textbook and slides) will be provided via google classroom before commencement of the lectures.

Documents (pdfs of the textbook and slides) will be provided via via google classroom 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

Notes for reference
N/A
N/A

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
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 (60%) and the final report (40%)
S: total points, 90 or higher (out of 100 points).
A: total points, 80 or higher (out of 100 points).
B: total points, 70 or higher (out of 100 points).
C: total points, 60 or higher (out of 100 points).
Grades will be based on theme reports from each lecture (60%) and the final report (40%)
S: total points, 90 or higher (out of 100 points).
A: total points, 80 or higher (out of 100 points).
B: total points, 70 or higher (out of 100 points).
C: total points, 60 or higher (out of 100 points).

Examination
レポートで実施
By Report

Details of examination
N/A
N/A

Other information
Please contact Prof. Nakauchi (F2-702-2, nakauchi@tut.jp) if you have any questions.
Please contact Prof. Nakauchi (F2-702-2, nakauchi@tut.jp) if you have any questions.

Reference URL
Will be announced during the lecture.
Will be announced during the lecture.

Office hours
Anytime, but contact to Prof.Nakauchi by e-mail beforehand.
Anytime, but contact to Prof.Nakauchi by e-mail beforehand.

Relations to attainment objectives of learning and education
C)高度な知識を統合的・発展的に活用できる実践力・創造力

(C)高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(C) Practical and creative ability to use advanced knowledge in an integrated and developmental manner

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words
cognitive neurosciences, perception, vision
cognitive neurosciences, perception, vision

(D53030480)Advanced Human Sensation and Perception 2[Advanced Human Sensation and Perception 2]

Subject name[English]	Advanced Human Sensation and Perception 2[Advanced Human Sensation and Perception 2]				
Schedule number	D53030480	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Tue.4～4	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	鯉田　孝和 KOIDA Kowa				
Numbering	CMP_DOC73025				

Objectives of class

After the course, students will be able to understand the structure and function of the sensory systems and how sensation and perception work together to help us to guide our behavior. Students will able to utilize psychophysical methods to measure the perception, and data analysis theory as well.

Contents of class

Courses on physiological mechanisms for sensation and perception, the visual cortex and beyond (1st quarter), colour perception, objects/scene, depth and size, motion, attention, and project work on "Illusion Hack" (2nd quarter).

Course moderator: Prof. Shigeki Nakauchi
Course instructors: Prof. Shigeki Nakauchi, Assoc.prof. Kowa Koida

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

E. Bruce Goldstein, " Sensation and Perception ", 8th edition 135 Visual Phenomena & Optical Illusions (https://michaelbach.de/ot/index.html)
E. Kandel et al., "Principles of Neural Science", 5th Edition

Goals to be achieved

Course and project work, active participation.

Evaluation of achievement

(written assignments / project work) Scale 0–5 (0 = fail, 5 = excellent)

Examination

授業を実施
Regular Class

Details of examination

Other information

Reference URL

Office hours

Relations to attainment objectives of learning and education

情報・知能工学専攻
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。

（C）高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

Graduate Program of Computer Science and Engineering for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare
(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

(D53030490)Advanced X Reality and Psychology 1[Advanced X Reality and Psychology 1]

Subject name[English]	Advanced X Reality and Psychology 1[Advanced X Reality and Psychology 1]				
Schedule number	D53030490	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall1 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	北﨑 充晃 KITAZAKI Michiteru				
Numbering	CMP_DOC73025				

Objectives of class

After the course, students will understand the principles of X reality (cross reality: XR) including virtual reality (VR), mixed reality (MR), and augmented reality (AR) on psychological, physiological, and functional levels. They will also be able to understand the benefits and challenges of VR/MR/AR/XR on the future society.

After the course, students will understand the principles of X reality (cross reality: XR) including virtual reality (VR), mixed reality (MR), and augmented reality (AR) on psychological, physiological, and functional levels. They will also be able to understand the benefits and challenges of VR/MR/AR/XR on the future society.

Contents of class

講義も学生のプレゼンも全て英語で行われます(All lectures including presentations are conducted in English)。

X Reality including Virtual Reality, Mixed Reality, and Augmented Reality will be explained about its mechanisms and functions not only in the engineering perspective but also psychological perspective. The final part of the class is composed of students' presentations of their original application, device or idea on X Reality and the discussion on it.

(on-demand) 1. Introduction to XR and Psychology
(on-demand) 2. Two components of reality
(on-demand) 3. Visual reality, Mixed Reality and Augmented reality
(on-demand) 4. Multi- and Cross-modality phenomenon
(on-demand) 5. Embodied cognition and Augmented human
(online interactive) 6. Exploring cyberspace
(online interactive) 7. Presentations by students and Discussion
(online interactive) 8. Presentations by students and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

X Reality including Virtual Reality, Mixed Reality, and Augmented Reality will be explained about its mechanisms and functions not only in the engineering perspective but also psychological perspective. The final part of the class is composed of students' presentations of their original application, device or idea on X Reality and the discussion on it.

(on-demand) 1. Introduction to XR and Psychology
(on-demand) 2. Two components of reality
(on-demand) 3. Visual reality, Mixed Reality and Augmented reality
(on-demand) 4. Multi- and Cross-modality phenomenon
(on-demand) 5. Embodied cognition and Augmented human
(online interactive) 6. Exploring cyberspace
(online interactive) 7. Presentations by students and Discussion
(online interactive) 8. Presentations by students and Discussion

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Read the documents provided before each lecture (90min).

Review the lectures in consultation with the references provided and other resources such as scientific articles and research youtube video (90min).
Read the documents provided before each lecture (90min).
Review the lectures in consultation with the references provided and other resources such as scientific articles and research youtube video (90min).

Related subjects

X Reality and Psychology 2
Human Sensation and Perception 1 and 2
X Reality and Psychology 2
Human Sensation and Perception 1 and 2

Notes for textbook

NA
NA

Notes for reference

Read the documents provided before each lecture. Review the lectures in consultation with references and other resources such as scientific articles and youtube research video.
Read the documents provided before each lecture. Review the lectures in consultation with references and other resources such as scientific articles and youtube research video.

Goals to be achieved

To understand fundamentals on perception and cognition as basics for virtual reality (VR)
To understand principles of virtual reality (VR), mixed reality (MR), and augmented reality (AR)
To understand current findings on VR/MR/AR research
To consider the benefits and challenges of VR/MR/AR on the future society
To understand fundamentals on perception and cognition as basics for virtual reality (VR)
To understand principles of virtual reality (VR), mixed reality (MR), and augmented reality (AR)
To understand current findings on VR/MR/AR research
To consider the benefits and challenges of VR/MR/AR on the future society

Evaluation of achievement

Grades will be based on performance in each lecture (40%) and the final report (60%)
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)
Grades will be based on performance in each lecture (40%) and the final report (60%)
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

NA
NA

Other information

NA
NA

Reference URL

NA
NA

Office hours

One hour after lecture. Please contact by e-mail mich@tut.jp
One hour after lecture. Please contact by e-mail mich@tut.jp

Relations to attainment objectives of learning and education

Key words

virtual reality, augmented reality, cognition
virtual reality, augmented reality, cognition

(D53030500)Advanced X Reality and Psychology 2[Advanced X Reality and Psychology 2]

Subject name[English]	Advanced X Reality and Psychology 2[Advanced X Reality and Psychology 2]				
Schedule number	D53030500	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Elective
Time of starting a course	Fall2 term	**Day of the week,period**	Thu.2～2	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	松井 淑恵, 南 哲人 MATSUI Toshie, MINAMI Tetsuto				
Numbering	CMP_DOC73025				

Objectives of class

仮想現実(virtual reality, VR)、複合現実(mixed reality, MR)、拡張現実(augmented reality, AR)、およびクロスリアリティ(cross reality, XR)の原理を、心理的、生理学的、および機能レベルで理解できるようになります。 また、将来の社会における VR/MR/AR/XR の利点と課題についての理解を深めます。

After the course, students will understand the principles of virtual reality (VR), mixed reality (MR), augmented reality (AR), and X reality (cross reality: XR), on psychological, physiological, and functional levels. They will also be able to understand the benefits and challenges of VR/MR/AR/XR on the future society.

Contents of class

X reality and Psychology I(第一クォーター)で学んだ、視覚認知、聴覚認知、触覚およびその他のモダリティの認知、クロスモーダル認知、VR、MR、および AR について、関連する話題についての講義と演習を行います。

第 1 週 導入(対面) 担当: 南
第 2 週 計測手法一般(オンデマンド) 担当: 南
第 3 週 脳波(オンデマンド) 担当: 南
第 4 週 眼球運動(オンデマンド) 担当: 南
第 5 週 空間聴覚(オンデマンド) 担当: 松井
第 6 週 バイノーラル聴覚と音のリアリティ(オンデマンド) 担当: 松井
第 7 週 視覚と聴覚のインタラクション(オンデマンド) 担当: 松井

本学の新型コロナウィルス感染拡大防止のための活動基準の変更に伴い、授業内容および成績の評価法に変更が生じる場合があります。
授業実施形態が変更になる場合は, GoogleClassroom または教務情報システムより通知します。

Lectures and project works related topics on X reality and Psychology I (1st quarter): visual cognition, auditory cognition, tactile and other modality cognition, cross-modal cognition, VR, MR, and AR.

Week 1. Introduction (face to face) by Prof. Minami
Week 2. Methods of X reality and Psychology (On-demand: you can take the class whenever you want) by Prof. Minami
Week 3. EEG (On-demand) by Prof. Minami
Week 4. Eye-tracking (On-demand) by Prof. Minami
Week 5. Spatial hearing (On-demand) by Assoc. prof. Matsui
Week 6. Binaural hearing and sound reality (On-demand) by Assoc. prof. Matsui
Week 7. Interaction between the visual and auditory system (On-demand) by Assoc. prof. Matsui

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, we will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

予習: 講義の指定範囲を事前に下調べする。(90 分)
復習:配布資料を整理し、関連情報を検索して知識の幅を広げる。(90 分)

Preparation: Preliminary research on the designated range of the lecture. (90 minutes)
Review: Organize handouts and search for relevant information to broaden your knowledge. (90 minutes)

Related subjects

X Reality and Psychology I
Human perception and sensation
X Reality and Psychology I

Human perception and sensation

Notes for textbook

授業中にハンドアウトを配布します。
Handouts will be distributed in the class.

Notes for reference

特になし
N/A

Goals to be achieved

仮想現実（Virtual Reality）、複合現実（Mixed Reality）、拡張現実（Augmented Reality）、およびクロスリアリティ（Crossed reality）の原理を、心理的、生理学的、および機能レベルにおける理解。また、将来の社会における VR/MR/AR/XR の利点と課題についての理解
To understand the principles of virtual reality (VR), mixed reality (MR), augmented reality (AR), and X reality (cross reality: XR), on psychological, physiological, and functional levels. And to understand the benefits and challenges of VR/MR/AR/XR on the future society.

Evaluation of achievement

評価基準：原則的にすべての講義に出席したものにつき、下記のように成績を評価する。
S：レポートの合計点（100 点満点）が 90 点以上
A：レポートの合計点（100 点満点）が 80 点以上
B：レポートの合計点（100 点満点）が 70 点以上
C：レポートの合計点（100 点満点）が 60 点以上
Students who attend all the classes will be evaluated as follows:
S: Obtained total points of weekly assignments, 90 or higher (out of 100 points).
A: Obtained total points of weekly assignments, 80 or higher (out of 100 points).
B: Obtained total points of weekly assignments, 70 or higher (out of 100 points).
C: Obtained total points of weekly assignments, 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

特になし
N/A

Other information

特になし
N/A

Reference URL

特になし
N/A

Office hours

必要に応じて随時対応します。メールなどで事前に連絡を取ってください。

On a necessary basis. Please contact me by e-mail in advance.

Relations to attainment objectives of learning and education

（C）高度な知識を統合的・発展的に活用できる実践力・創造力
情報・知能工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(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 suchknowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

(D54010050)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D54010050	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 教務委員会副委員長 4kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71015				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Related subjects

N/A

Notes for textbook

N/A

Notes for reference

N/A

Goals to be achieved The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.
Evaluation of achievement Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.
Examination 試験期間中には何も行わない None during exam period
Details of examination N/A
Other information N/A
Reference URL N/A
Office hours N/A
Relations to attainment objectives of learning and education
Key words

(D54010080)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	D54010080	**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)**	4
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	CHE_DOC75015				

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 scientific papers under the guidance of his/her supervisor. The aim of the lessen for the students is to learn the latest 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 scientific 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

Preparation (20 minutes or more) and review (25 minutes or more) are generally required for each class.
Your advisor will give you more detailed instructions on preparation and review as needed.

Related subjects

Seminar on Applied Chemistry and Life Sciences 2
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

N/A

Goals to be achieved

To acquire advanced 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

N/A

Other information

N/A

Reference URL

http://chem.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 and constructive manner
Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience,methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields
(D) Communication skills for global success
Have the communication skills to effectively express and disseminate one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other teammembers as well as leadership ability to contribute to the team's achievements
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the ability to explore the nature of changes in society, environment and technology and tovoluntarily make plans and learn throughout one's life

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

(D54010090)Seminar on Applied Chemistry and Life Science 2[Seminar on Applied Chemistry and Life Science 2]

Subject name[English]	Seminar on Applied Chemistry and Life Science 2[Seminar on Applied Chemistry and Life Science 2]				
Schedule number	D54010090	**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)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S4系教務委員 4kei kyomu Iin-S				
Numbering	CHE_DOC75015				

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 scientific papers under the guidance of his/her supervisor. The aim of the lessen for the students is to expand the knowledge and presentation skills acquired in Seminar on Seminar on Applied Chemistry and Life Science 1.

Contents of class

The students will be required to read scientific 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

Preparation (20 minutes or more) and review (25 minutes or more) are generally required for each class.
Your advisor will give you more detailed instructions on preparation and review as needed.

Related subjects

Seminar on Applied Chemistry and Life Sciences 1
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

N/A

Goals to be achieved

To acquire advanced 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

N/A

Other information

N/A

Reference URL

http://chem.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 and constructive manner

Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience,methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields

(D) Communication skills for global success

Have the communication skills to effectively express and disseminate one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other teammembers as well as leadership ability to contribute to the team's achievements

(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment

Have the ability to explore the nature of changes in society, environment and technology and tovoluntarily make plans and learn throughout one's life

Key words

Applied chemistry, Life science, Materials science and engineering

(D54020010)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	D54020010	**Subject area**	Advanced Applied Chemistry and Life Science	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎 kyoumu iinkai fukuiintyou, TANAKA Saburo				
Numbering	COM_DOC51005				

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 (October 6, 2021): Introduction, 1st module in e-learning
2nd – 6th week (October 13 – November 17): 2nd – 7th modules in e-learning
Submit the e-learning Certificate to the Educational Affairs Division
7th week: (November 24 – November 30)Discussion with supervisor
8th week: Report (December 1, 2021)

e-learning
1st module: Research Misconduct
2nd module: Ethical Issues in the Management of Data in Engineering Research
3rd module: Responsible Authorship
4th module: Ethical Issues in the Peer Review and Publication of Engineering Research
5th module: Collaborative Research in Engineering Fields
6th module: Whistleblowing and the Obligation to Protect the Public
7th module: Managing Public Research Funds

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students will need to review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

N/A

Reference1	**Book title**	For the sound development of science : the attitude of a conscientious scientist			**ISBN**	978-4-621-08938-5
	Author	edited by Japan Society for the Promotion of Science Editing Committee "For the Sound Development of Science"	**Publisher**	Maruzen	**Publish year**	2015

Notes for reference

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' research specialties.

Evaluation of achievement

[Evaluation method] Report(100%)

[Evaluation 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

N/A

Reference URL

N/A

Office hours

Before/after the class

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性

上級技術者・研究者として社会的・倫理的責任を有し，社会における技術的課題を設定・解決・評価する能力を身につけている。

(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について考える能力を身につけている。

(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; and have the ability to set, solve and evaluate technical issues in society

(A) Personality and outlook with a broad perspective

Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as public welfare

Key words

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

(D54030050)Advanced Biotechnology 2[Advanced Biotechnology 2]

Subject name[English]	Advanced Biotechnology 2[Advanced Biotechnology 2]				
Schedule number	D54030050	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.5～5	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	吉田 絵里, 沼野 利佳, 吉田 祥子 YOSHIDA Eri, NUMANO Rika, YOSHIDA Sachiko				
Numbering	CHE_DOC73225				

Objectives of class

To acquire knowledge of advanced biotechnology including biology, biochemistry, physiology, and engineering.

Contents of class

Weeks 1~5: 1. Neural physiology and sensing (Yoshida, S)
remote simultaneous interactive 1-1 Function and diversity of physiological substances
remote simultaneous interactive 1-2 Information transmission between neurons
remote simultaneous interactive 1-3 Brain function and neuronal circuits
remote simultaneous interactive 1-4 Neuronal development and environmental materials
remote simultaneous interactive 1-5 Memory and emotion

Weeks 6~10: 2. Neural physiology and sensing (Numano, R)
2-1 The method to visualize biological phenomena (mainly on circadian rhythms)
2-2 The science topics
2-3 topicsThe method to visualize biological phenomena (mainly on neurosciences)
2-4 The science topics
2.Molecular biology
2-1 History of molecular biology
2-2 Technique of molecular biology
2-3 Topic of molecular biology1 (Genome)
2-4 Topic of molecular biology2 (Circadian Rhythms)

Weeks 11~15: 3. Bio-related polymer chemistry and engineering (Yoshida, E)
(on-demand) Week 11: 3-1 Bio-related nanomaterials
(on-demand) Week 12: 3-2 Design of bio-related polymers
(on-demand) Week 13: 3-3 Molecular self-assembly in vivo
(on-demand) Week 14: 3-4 Self-assembly of synthetic polymers
(on-demand) Week 15: 3-5 Supramolecular chemistry and engineering

Due to changes in the standards for activities to prevent the spread of COVID-19 infection at the Toyohashi University of Technology, there may be changes in the class content and grade evaluation method.
When the class form changes, you will be notified from Google Classroom or the Academic Affairs Information System.

Self Preparation and Review

Go over the lecture materials and your notebook to enhance your understanding.

Related subjects

Advanced Polymer Engineering

Notes for textbook

No textbook is needed.

Notes for reference

N／A

Goals to be achieved

To understand cutting-edge biotechnology based on cell biology, physiology, RNA engineering, molecular self-assembly, and bio-related nanomaterials.

Evaluation of achievement

Course Grade:
Reports (by Yoshida S, Numano, and Yoshida E) = 100%

Evaluating:
S: Total score of 90 or higher
A: 80 through 89
B: 70 through 79
C: 60 through 69

Examination
レポートで実施
By Report

Details of examination
N／A

Other information
Sachiko Yoshida: ex.6802, syoshida@tut.jp, B-406
Rika Numano: ex.6902, numano@tut. jp, G-407
Eri Yoshida: ex.6814, yoshida.eri.gu@tut.jp, B-503

Reference URL
N／A

Office hours
Anytime

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and constructive manner
Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience, methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the ability to explore the nature of changes in society, environment and technology and to voluntarily make plans and learn throughout one's life

Key words
Nanostructure, Molecular self-assembly, Supramolecules, Neuronal circuit, cell differentiation

(D54030070)Advanced Molecular Function Chemistry 2[Advanced Molecular Function Chemistry 2]

Subject name[English]	Advanced Molecular Function Chemistry 2[Advanced Molecular Function Chemistry 2]				
Schedule number	D54030070	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.4～4	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	辻 秀人, 齊戸 美弘, 手老 龍吾 TSUJI Hideto, SAITO Yoshihiro, TERO Ryugo				
Numbering	CHE_DOC72225				

Objectives of class

Since Applied Chemistry and Life Science are based on various scientific fields related each other, it is important to acquire broader knowledge and understanding of them. In this class, three topics closely relevant to Applied Chemistry and Life Science are open. Objectives of this class is to obtain the in-depth understanding of selected one of these topics.

Contents of class

[1] Biobased and biodegradable polymers are developed and studied in terms of various applications including biomedical, pharmaceutical and environmental applications. This course covers the fundamentals, synthesis, characterization, properties, and degradation of biobased and biodegradable polymers. Presentation or submission of a report regarding the current researches on biobased and biodegradable polymers is required. The type of classes will be determined based on the covid-19 situation. (by H. Tsuji)

1st week: Fundamentals of biobased and biodegradable polymers 1
2nd week: Fundamentals of biobased and biodegradable polymers 2
3rd week: Fundamentals of biobased and biodegradable polymers 3
4th week: Synthesis of biobased and biodegradable polymers 1
5th week: Synthesis of biobased and biodegradable polymers 2
6th week: Synthesis of biobased and biodegradable polymers 3
7th week: Characterization of biobased and biodegradable polymers 1
8th week: Characterization of biobased and biodegradable polymers 2
9th week: Characterization of biobased and biodegradable polymers 3
10th week: Properties of biobased and biodegradable polymers 1
11th week: Properties of biobased and biodegradable polymers 2
12th week: Properties of biobased and biodegradable polymers 3
13th week: Degradation of biobased and biodegradable polymers 1
14th week: Degradation of biobased and biodegradable polymers 2
15th week: Degradation of biobased and biodegradable polymers 3
16th week: Presentation by students

[2] Miniaturization and automation of the whole separation instruments have been one of the most 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. On the basis of the above concept, miniaturized sample preparation and separation techniques will be discussed along with the effective coupling of these techniques. Submission of a comprehensive report regarding these topics is required. The lecture schedule, including face-to-face or on-demand learning, will be decided on the basis of the interview. (by Y. Saito)

1st week: Fundamentals of separation science, Part 1
2nd week: Fundamentals of separation science, Part 2
3rd week: Fundamentals of separation science, Part 3
4th week: Fundamentals of liquid phase separation methods
5th week: Miniaturization of liquid phase separation methods
6th week: Applications of liquid phase separation methods
7th week: Fundamentals of gas phase separation methods
8th week: Miniaturization of gas phase separation methods
9th week: Applications of gas phase separation methods

10th week: Fundamentals of sample preparation techniques
11th week: Miniaturization of sample preparation techniques
12th week: Applications of sample preparation techniques
13th week: Applications of miniaturized sample preparation techniques
14th week: Miniaturization of modern separation methods, Part 1
15th week: Miniaturization of modern separation methods, Part 2
16th week: Presentation by the students.

[3] Molecular interaction and assembly are key factors for the understanding of the function of biomolecules. This class covers the fundamental and advanced topics of assembly and functions of biomolecules, e.g. proteins, lipids and nucleotides, and related experimental techniques. Submission of a report regarding a chapter of the reference book and a related current research is required. (by R. Tero).

1st week: Fundamental concepts of surface and interface (1)
2nd week: Fundamental concepts of surface and interface (2)
3rd week: Surface energy and interface energy (1)
4th week: Surface energy and interface energy (2)
5th week: Amphiphilic molecules and their assembly (1)
6th week: Amphiphilic molecules and their assembly (2)
7th week: Hydrophilicity of surfaces (1)
8th week: Hydrophilicity of surfaces (2)
9th week: Electrostatic interaction in electrolyte solutions (1)
10th week: Electrostatic interaction in electrolyte solutions (2)
11th week: Dispersion interaction (1)
12th week: Dispersion interaction (2)
13th week: Colloid and interfaces in industry and biological systems (1)
14th week: Colloid and interfaces in industry and biological systems (2)
15th week: Recent progress in surface and interface sciences
16th week: Presentation by the students

***
If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.
If there is any changes in the class schedule, we will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Related subjects

Notes for textbook
Related materials will be provided.

Reference1	**Book title**	Poly(lactic acid): Synthesis, Structures, Properties, Processing, and Applications			**ISBN**	0470293667
	Author	Rafael A. Auras, Loong-Tak Lim, Susan E. M. Selke, Hideto Tsuji	**Publisher**	Wiley	**Publish year**	2010
Reference2	**Book title**	Intermolecular and surface forces			**ISBN**	978-0123751829
	Author	Jacob N. Israelachvili	**Publisher**	Academic Press	**Publish year**	2011

Notes for reference
#2 for the topic [3] (R. Tero).

Goals to be achieved
To obtain the in-depth understanding of topic relevant to Enviromental and Life Science.

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

H.Tsuji: room (G-606), e-mail (tsuji@ens.tut.ac.jp), phone: 6922
Y.Saito: room (B-402), e-mail (saito@chem.tut.ac.jp), phone: 6803
R.Tero: room (G-402), e-mail (tero@tut.jp), phone: 6917

Reference URL

Office hours

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

Relations to attainment objectives of learning and education

応用化学・生命工学専攻
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
応用化学・生命工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。
(E)最新の技術や社会環境の変化に対する探究心と持続的学習力
社会，環境，技術等の変化の本質を探求し，生涯にわたって自発的に計画し学習する能力を身につけている。
(C) Practical and creative skills to utilize advanced knowledge in an integrated and constructive manner
Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience, methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the ability to explore the nature of changes in society, environment and technology and to voluntarily make plans and learn throughout one's life

Graduate Program of Applied Chemistry and Life Science for Doctoral Degree
(C) Practical and creative skills to utilize advanced knowledge in an integrated and constructive manner
Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience,methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the ability to explore the nature of changes in society, environment and technology and tovoluntarily make plans and learn throughout one's life

Key words

(D54030080)Advanced Chemical Technology[Advanced Chemical Technology]

Subject name[English]	Advanced Chemical Technology[Advanced Chemical Technology]				
Schedule number	D54030080	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.2～2	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	松本　明彦, 水嶋　生智, 小口　達夫, 髙島　和則 MATSUMOTO Akihiko, MIZUSHIMA Takanori, OGUCHI Tatsuo, TAKASHIMA Kazunori				
Numbering	CHE_DOC72225				

Objectives of class

This course aims to fundamental understanding of state-of-art technologies on the basis of physical and inorganic chemistry.

Contents of class

The following articles will be explained in the course.

1. Physical chemistry and inorganic chemistry for an understanding of state-of-art technologies used in various fields including environmental protection and/or restoration
(1) Physical chemistry and colloid & interface science [A. Matsumoto] (Face to Face)
(2) Inorganic chemistry and catalysis chemistry [T. Mizushima]
(3) Reaction mechanism of combustion and related phenomena.[T. Oguchi]
(4) Atmospheric pressure reactive plasma [K. Takashima]

2. The features of the techniques used in environmental protection and restoration
(1) Adsorption and separation technology [A. Matsumoto]
(2) Catalysis technology [T. Mizushima]]
(3) Combustion control of fuels [T. Oguchi]
(4) Plasma catalysis technology [K. Takashima]

3. Practical examples of the techniques
[All instructors]

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of COVID-19, the course content and evaluation of achievement are subject to change.
If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Follow the instructions of each professors.

Related subjects

Basic understanding on physical chemistry and inorganic chemitry is essential.

Notes for textbook

Reference handouts will be provided in each class.

Notes for reference

N/A

Goals to be achieved

Evaluation of achievement

30 % Homework report and 70 % Final report
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

N/A

Other information

Matsumoto Akihiko: room # B-504, E-mail: aki-at-chem.tut.ac.jp (replace "-at-" by "@")
Mizushima Takanori: room # B-303, E-mail: mizushima-at-chem.tut.ac.jp (replace "-at-" by "@")
Oguchi Tatsuo: room # G-406, E-mail: oguchi-at-tut.jp(replace "-at-" by "@")
Takashima Kazunori: room # G-504, E-mail: takashima-at-ens.tut.ac.jp(replace "-at-" with "@")

Students who intend to take the class are asked to contact with one of the instructors before registration.

Reference URL

N/A

Office hours

At any time but booking is required in advance.

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and constructive manner
Have the ability to create imaginative technology to solve problems and put them into practice through learning, by experience, methodologies for research and development on the basis of the integration of extensive knowledge about applied chemistry, life science and their related fields
(E) Inquisitive outlook and skills for continuous learning in response to state-of-the-art technology and changes in the social environment
Have the ability to explore the nature of changes in society, environment and technology and to voluntarily make plans and learn throughout one's life

Key words

(D54030090)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D54030090	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S4系教務委員, 教務委員会副委員長 4kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71025				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Related subjects

N/A

Notes for textbook

N/A

Notes for reference

N/A

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.

Examination

試験期間中には何も行わない

None during exam period

Details of examination

N/A

Other information

N/A

Reference URL

N/A

Office hours

N/A

Relations to attainment objectives of learning and education

Key words

(D55010010)Seminar on Architecture and Civil Engineering 1[Seminar on Architecture and Civil Engineering 1]

Subject name[English]	Seminar on Architecture and Civil Engineering 1[Seminar on Architecture and Civil Engineering 1]				
Schedule number	D55010010	**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)**	4
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_DOC71015				

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

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

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

Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

(D) Communication skills for global success

Have the communication skills to effectively express and transmit one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members.

Have sophisticated ability as a leader to contribute for the achievement the goal of team.

(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 investigate the essence of changes in society, environment and technology.
Have the skills to voluntarily make plans and learn throughout one's life.

Key words

(D55010020)Seminar on Architecture and Civil Engineering 2[Seminar on Architecture and Civil Engineering 2]

Subject name[English]	Seminar on Architecture and Civil Engineering 2[Seminar on Architecture and Civil Engineering 2]				
Schedule number	D55010020	**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)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S5系教務委員 5kei kyomu Iin-S				
Numbering	ARC_DOC71015				

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

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

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

Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

(D) Communication skills for global success

Have the communication skills to effectively express and transmit one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members.

Ha(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 investigate the essence of changes in society, environment and technology.

Have the skills to voluntarily make plans and learn throughout one's life.
ve sophisticated ability as a leader to contribute for the achievement the goal of team.

Key words

(D55010050)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D55010050	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 教務委員会副委員長 5kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71015				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.

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

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

Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

(D) Communication skills for global success

Have the communication skills to effectively express and transmit one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members.

Ha(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 investigate the essence of changes in society, environment and technology.

Have the skills to voluntarily make plans and learn throughout one's life.

ve sophisticated ability as a leader to contribute for the achievement the goal of team.

Key words

(D55020010)Ethics for Researchers[Ethics for Researchers]

Subject name[English]	Ethics for Researchers[Ethics for Researchers]				
Schedule number	D55020010	**Subject area**	Advanced Architecture and Civil Engineering	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	教務委員会副委員長, 田中　三郎 kyoumu iinkai fukuiintyou, TANAKA Saburo				
Numbering	COM_DOC51005				

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 (October 6, 2021): Introduction, 1st module in e-learning
2nd – 6th week (October 13 – November 17): 2nd – 7th modules in e-learning
Submit the e-learning Certificate to the Educational Affairs Division
7th week: (November 24 – November 30)Discussion with supervisor
8th week: Report (December 1, 2021)

e-learning
1st module: Research Misconduct
2nd module: Ethical Issues in the Management of Data in Engineering Research
3rd module: Responsible Authorship
4th module: Ethical Issues in the Peer Review and Publication of Engineering Research
5th module: Collaborative Research in Engineering Fields
6th module: Whistleblowing and the Obligation to Protect the Public
7th module: Managing Public Research Funds

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Students will need to review each lesson.

Related subjects

Philosophy of Science and Technology, Ethics for Engineers

Notes for textbook

N/A

Reference1	**Book title**	For the sound development of science : the attitude of a conscientious scientist			**ISBN**	978-4-621-08938-5
	Author	edited by Japan Society for the Promotion of Science Editing Committee "For the Sound Development of Science"	**Publisher**	Maruzen	**Publish year**	2015

Notes for reference

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' research specialties.

Evaluation of achievement

[Evaluation method] Report(100%)

[Evaluation 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

N/A

Reference URL

N/A

Office hours

Before/after the class

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性

上級技術者・研究者として社会的・倫理的責任を有し，社会における技術的課題を設定・解決・評価する能力を身につけている。

(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について考える能力を身につけている。

(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; and have the ability to set, solve and evaluate technical issues in society

(A) Personality and outlook with a broad perspective

Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as public welfare

Key words

Research Ethics, Conflict of Interest, Legal Compliance, Research Misconduct, Confidentiality Obligation, Security Export Control Policy, Copyright, Professionalism

(D55030010)Advanced Mechanics and Design of Spatial Structure Systems[Advanced Mechanics and Design of Spatial Structure Systems]

Subject name[English]	Advanced Mechanics and Design of Spatial Structure Systems[Advanced Mechanics and Design of Spatial Structure Systems]				
Schedule number	D55030010	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	中澤 祥二, 松本 幸大 NAKAZAWA Shoji, MATSUMOTO Yukihiro				
Numbering	ARC_DOC72125				

Objectives of class

This lecture is concerned with the advanced theoretical and applied structural mechanics of spatial structures. The primary purpose is to encourage students to gain the advanced concept and to raise their engineering abilities for innovative applications in the future.

Contents of class

1. Introduction and Analogical understanding of structural instability behavior
2. Effects of imperfections on the structural instability
3. Structural instability modes and large deflection modes
4. Physical experiment and its difficulty on structural instability problems
5. Mathematical analysis and its difficulty on structural instability problems
6. Relationship between experiments and numerical simulations
7. Design procedures for the instability of spatial structures

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change. If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

Related subjects

Notes for textbook

Reference1	**Book title**	The Theory of Plates and Shells			**ISBN**	0070858209
	Author	S. Timoshenko	**Publisher**	McGraw-Hill Publishing Company	**Publish year**	1964
Reference2	**Book title**	Theory of Elastic Stability			**ISBN**	0486472078
	Author	S. Timoshenko	**Publisher**	Dover Publications	**Publish year**	1961
Reference3	**Book title**	DYNAMIC ANALYSIS OF EARTHQUAKE RESISTANT STRUCTURES			**ISBN**	4861631149
	Author	Akenori Shibata	**Publisher**	東北大学出版会	**Publish year**	2010

Notes for reference

Goals to be achieved

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

Evaluation of achievement

Based on reports.

Examination

その他
Other

Details of examination

Other information

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

Office hours
Nakazawa; Monday, 16:20–17:50
Matsumoto; Friday, 9:30–12:00

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and developed manner
Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

(D55030020)Advanced Structural Design[Advanced Structural Design]

Subject name[English]	Advanced Structural Design[Advanced Structural Design]				
Schedule number	D55030020	**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 Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	齊藤　大樹, 松井　智哉 SAITOH Taiki, MATSUI Tomoya				
Numbering	ARC_DOC72125				

Objectives of class

建築物の耐震設計における振動解析技術と耐震設計法を学ぶ

Learn about a vibration analysis technology in seismic design of building and seismic design method

Contents of class

1-2 週間、1 自由度システムの振動
3-4 週、弾性地震応答解析、数値積分法
5-6 週、多自由度振動系、固有値解析
7-8 週間、応答スペクトル
9 週目、弾塑性地震応答解析
10 週目、等価線形化法
11 週、設計入力地盤運動
12～13 週、エネルギー法の基本
14 週、限界強度計算の基本

「本学の新型コロナウィルス感染拡大防止のための活動基準の変更に伴い、授業内容および成績の評価法に変更が生じる場合があります。」

1-2 weeks, Vibration of one degree of freedom system
3-4 weeks, Elastic seismic response analysis, numerical integration method
5-6 weeks, Multi-degree-of-freedom system of vibration, Eigen value analysis
7-8 weeks, Response spectrum
9 week, Elastic-plastic seismic response analysis
10 week, Equivalent linearization method
11 week, Design input ground motion
12-13 weeks, Basic of the energy method
14 weeks, Basic of the limit strength calculation

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

振動解析の背景と理論を理解し、振動解析に基づく構造物の設計手法を理解する。

Understand the background and theory of vibration analysis and the design method of the structure based on vibration analysis.

Evaluation of achievement

レポートに基づき評価する

Grade is evaluated based on the report.

Examination

レポートで実施

By Report

Details of examination

Assessment:
Grade is evaluated based on the report in fall semester 1(50%), and the report in fall semester 2(50%).
Grading:
A: exam, 80 or higher (out of 100 points)
B: exam, 65 or higher (out of 100 points)
C: exam, 55 or higher (out of 100 points)

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 and developed manner
Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

(D55030040)Advanced Theory in Architectural Design[Advanced Theory in Architectural Design]

Subject name[English]	Advanced Theory in Architectural Design[Advanced Theory in Architectural Design]				
Schedule number	D55030040	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.5～5	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	松島 史朗, 水谷 晃啓 MATSUSHIMA Shiro, MIZUTANI Akihiro				
Numbering	ARC_DOC73225				

Objectives of class

This is essentially a class for research method that students involved are expected to play intiative roles. Because students come with different back ground and have different interests, the research topics may be diverse and, hence, In this class, students should take own topics and write reports on thr progress status. And they may be required to give presenrations on their research using a simple and comprehensive format to other faculty members.

Contents of class

1 Guidance
2-3 Discussion about the big questions that well describe what the students want to do.
4-5 To find and clarify supporting ideas that may be necessary to focus on the big question.
6-7 To develop and propose a research method write an interim report.
8 Midterm review: students are to give presentations in casual mode
9-13 To develop the structure of the dissertation to write the final paper. Particularly research methods are to be evaluated if they are feasible to the research.

14 Review session
15 Final presentation and Summary

*schedule is subject to change due to student background and research contents.
Lectures may be given by guest speakers and instructors.

The class will be a combination of the following methods depending on the situation.

on-demand(You can take the class whenever you want.)
face to face (Regular face to face class)
remote simultaneous interactive(You can talk interactively
with the lecture over the Internet at a set time.)

Self Preparation and Review

Students are required to write progress reports during the course of the classes to think and develop her/his own ideas step by step.

Related subjects

Notes for textbook

Reading materials are to be uploaded on Dreamcampus, so every student who registers the class can have an access and retrieve.

Notes for reference

Supplemental materials are to be uploaded when instructor thinks it is necessary.

Goals to be achieved

1)to clarify the causarity, that is very basic nethodology to pursue the facts.
2)to acquire and understand the fundamental knowledge about the research topics, and
3)to enhance the skills and knowledge that are necessary to evaluate the findings.

Evaluation of achievement

Evaluation of performance ： some reports
origiality, feasibility, and contribution to other research are to be counted.

Examination

レポートで実施
By Report

Details of examination

Since this class adopted a sort of active learning method, students paticipation is indispensable, and their contribution to the class is to be counted as a part f grading systems.

Other information

Reference URL

Office hours

12:30–14:30 on Tuesdays

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and developed manner
Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

Architectural Planning、space composition、Human life, Culture, Behavior and Activities, function
Architectural Planning、space composition、Human life, Culture, Behavior and Activities, function

(D55030060)Sustainable Urban Planning[Sustainable Urban Planning]

Subject name[English]	Sustainable Urban Planning[Sustainable Urban Planning]				
Schedule number	D55030060	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.5～5	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	浅野　純一郎, 小野　悠 ASANO Junichiro, ONO Haruka				
Numbering	ARC_DOC73025				

Objectives of class

1) To gain the practical knowledge of Sustainable urban planning.
2) To learn the advanced methods of urban planning which is based on “Sustainable development” conception.
3) To learn the theory and the movement of recent urban planning from EU, US, Japan.

Contents of class

all classes but the first guidance and the last oral presentation will be done by on-demand(You can take the class whenever you want.)
The major topics that will be addressed in this class are the followings,
1. Overview of the theory about urban planing based on “Sustainability” conception.
2. Overview of policies and methods about “Sustainable urban planning”.
3. Practice by application of “Sustainable urban planning” methods in the fields of land use, community, transportation, and so on.
4. Practice by application of the design methods about “Sustainable urban planning” in the fields of creative housing, living environment, and so on.

Anyway, regarding on the mentioned general contents above, the concrete topic in each semester would be pointed out on the first guidance by the lecturers with related papers or books which the students should read.

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for
Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Related subjects

The following knowledge is desirable,
1) The basic knowledge on urban planning and urban design
2) The knowledge on urban planning system in your country
3) The basic knowledge on GIS and CAD

Notes for textbook

Original textbook and papers are used in this class.

Notes for reference

Goals to be achieved

1) To be able to understand the practical knowledge of Sustainable urban planning.
2) To be able to understand the advanced methods of urban planning which is based on “Sustainable development” conception.
3) To be able to understand the theory and the movement of recent urban planning from EU, US, Japan.

Evaluation of achievement

Evaluation is based primarily on reports given by each instructor(100 points).
Each report is evaluated by each instructor.
The average of report scores is used as subject evaluation.
Grade, S:90 or higher, A: 80 or higher to lower than 90, B: 70 or higher to lower than 80, C: 60 or higher to lower than 70.

Examination

その他
Other

Details of examination

Other information

Junichiro ASANO:(D-708),e-mail:asano@ace.tut.ac.jp
Haruka Ono:(D-704) ono.haruka@ace.tut.ac.jp

Reference URL

http://urbandesign.web.fc2.com/MOTHER-hp/TEA-hp/top/e-main.html

Office hours

Relations to attainment objectives of learning and education

(C) Practical and creative skills to utilize advanced knowledge in an integrated and developed manner
Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

(D55030070)Advanced Geologic Hazard Mitigation Planning[Advanced Geologic Hazard Mitigation Planning]

Subject name[English]	Advanced Geologic Hazard Mitigation Planning[Advanced Geologic Hazard Mitigation Planning]				
Schedule number	D55030070	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Fri.2～2	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	三浦 均也, 松田 達也 MIURA Kinya, MATSUDA Tatsuya				
Numbering	ARC_DOC72725				

Objectives of class

For mitigation planning of natural disaster such as earthquakes, it is necessary to find out the optimum program to control the complex system which is composed of human activity and natural phenomena.The objectives of this lecture are learning of the mitigation planning mentioned above and the understanding the component of the complex system such as soils.

Contents of class

concerning the regional disaster mitigation for the natural disaster such as earthquakes and the component of the complex system such as soils, following matters are explained.

Self Preparation and Review

Related subjects

Geotechnical Analysis

Notes for textbook

特になし
N／A

Notes for reference

特になし
N／A

Goals to be achieved

The goal to be achieved is understanding the basic concept of the regional disaster mitigation for earthquakes and the future of the soils which is the component of the complex system.

Evaluation of achievement

Report and the presentation based on the report

Examination

レポートで実施
By Report

Details of examination

特になし
N／A

Other information

特になし
D-803, 0532-44-6844, k-miura@ace.tut.ac.jp
D-808, 0532-44-6849, t.matsuda@ace.tut.ac.jp

Reference URL

prepairing

Office hours

12:00-14:00 on Tuesday:Miura, 12:00-13:00 on Wendesday:Matsuda

Relations to attainment objectives of learning and education

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

Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words
Disaster, Earthquake, Geologic Hazards, Numerical Analysis

(D55030080)Advanced Water Environmental Engineering[Advanced Water Environmental Engineering]

Subject name[English]	Advanced Water Environmental Engineering[Advanced Water Environmental Engineering]				
Schedule number	D55030080	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Thu.1～1	**Credit(s)**	2
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	1～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	井上 隆信, 加藤 茂, 横田 久里子 INOUE Takanobu, KATO Shigeru, YOKOTA Kuriko				
Numbering	ARC_DOC74325				

Objectives of class

Acquiring wide knowledge and information concerning on water environment for thesis work
T. Inoue: Studying chemical aspect of river and lake environment
S. Kato : Studying physical aspect of coastal, ocean & estuarine environment and disaster
K. Yokota: Studying importance of field investigation on water environment in river

Contents of class

T. Inoue (1-5) :
01(face to face) : Introduction
02(face to face) : Valuation method of river and lake water quality
03(face to face) : Restoration of river and lake environment (1)
04(face to face) : Restoration of river and lake environment (2)
05(face to face) : Presentation by students

S. Kato (6-10) :
06(face to face) : Introduction
07(face to face) : Present situation about coastal, ocean & estuarine environment and disaster
08(face to face) : Cause and countermeasure for problems in coastal zone, ocean and estuary
09(face to face) : Water flow and material transport in coastal zone, ocean and estuary
10(face to face) : Presentation by students

K. Yokota (11-15) :
11(face to face) : Introduction
12(face to face) : Experimental method for material dynamics investigation
13(face to face) : Field measurement method for material dynamics investigation
14(face to face) : Analysis of material dynamics in water
15(face to face) : Presentation by students

(Attention)
- Contact one of instructors in advance.
- There are cases where the order of instructors is changed.
- If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

Self Preparation and Review

Preparation and review of the lecture for around 90 minutes each are essential.

Related subjects

N/A

Notes for textbook

No textbooks are specifird.
The resume or related handouts will be distributed.

Notes for reference

N/A

Goals to be achieved

(1) Understanding river and lake environmental problems and chemical approach to the solution

(2) Understanding the situation on coastal, ocean and estuarine environment and disaster, and countermeasures for related problems
(3) Understanding methods of measurement and analysis for material dynamics analysis in water

Evaluation of achievement

[Evaluation method]
Evaluation is based primarily on reports given by each instructor (100 points).
Each report is evaluated by each instructor.
The average of report scores is used as subject evaluation.

[Evaluation criteria(Grade)]
S: 90 or higher
A: 80 or higher to lower than 90
B: 70 or higher to lower than 80
C: 60 or higher to lower than 70.

Examination

その他
Other

Details of examination

Reports and/or oral examination by each instructor
The details will be informed by each instructor.

Other information

T. Inoue : D-811, inoue@ace.tut.ac.jp
S. Kato : D-812, s-kato@ace.tut.ac.jp
K. Yokota: D-810, yokota@ace.tut.ac.jp

Reference URL

N/A

Office hours

T. Inoue: Wednesday 12:30-13:30
S. Kato : At any time (You should contact Kato about your visit time by e-mail in advance.)
K. Yokota: Monday, 13:00-14:00

Relations to attainment objectives of learning and education

(B)技術者・研究者としての正しい倫理観と社会性
高度上級技術者・研究者としての専門的・倫理的責任を有し，社会における技術的課題を発見・設定・解決・評価する能力を身につけている。
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
建築・都市システム学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(B) Sound ethics and social awareness as advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as leading -level engineers and researchers; and have the ability to discover, set, solve andevaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated and developed manner
Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skillsto utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

Key words

water quality, water environment, river, lake, coast, ocean, estuary, natural disaster, material dynamics, field measurement, experiment

(D55030140)Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]

Subject name[English]	Seminar on Interdisciplinary Research[Seminar on Interdisciplinary Research]				
Schedule number	D55030140	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Elective
Time of starting a course	Fall term	**Day of the week,period**	Mon.3～3	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	S5系教務委員, 教務委員会副委員長 5kei kyomu Iin-S, kyoumu iinkai fukuiintyou				
Numbering	COM_DOC71025				

Objectives of class

New technologies are often developed from the combination of different disciplines. It is clear that successful interdisciplinary efforts require mastery of specific competencies. This course will develop a student's scientific and technical knowledge in which researchers from different disciplines. If such competencies are explicated, it might be possible to enhance researchers' abilities to develop the next generation in interdisciplinary scholarship.

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Contents of class

In this seminar, doctoral course student of 2nd year will make a presentation to other D2 students of different research fields, in order to obtain the research ability to integrate varieties of research fields. See the schedule.

1) Presentations

In this class, each student will make a presentation to other students of different research fields.

So the student who do the presentation will prepare the outline for approximately 2 pages (A4) , and make a power-point.

*Supervisor will come and check his student's presentation, if available.

2) Title and abstract of presentation

Not only D2 students, but also other students are welcome to attend the presentation.

So please submit the title and abstract (200 words) 3 weeks before your presentation to Academic Affairs Division.

We will post it on the bulletin board inside the campus.

3) Report you will submit

You will be requested to submit a report after each presentation to your supervisor. As an initial training to create a new research project, students will work to make brief summary of a topic from other student's research filed with the goal of creating research project. And students will complete a research proposal that will be integrated from other scientific field and their own research filed.

4) Schedule of your presentation

Please check the schedule given before the semester begins.

5) Absence from the class

Basically, you have to attend every class.

If you need to take absence due to the sickness or conference, please discuss with your supervisor what you should do instead.

Self Preparation and Review

Related subjects

Notes for textbook

Notes for reference

Goals to be achieved

The purpose of this class is to recognize how interdisciplinary-based research provides important knowledge and insight into complex problems and issues and also appreciate the unique advantages of integrative research and learning.

Evaluation of achievement

Your supervisor will check your report, and submit your academic score to the member of Academic Affairs Committee at the end of semester.

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

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

Have advanced knowledge about architecture and civil engineering as well as related fields; and have the practical and creative skills to utilize such knowledge for problem solving, understanding the methodology of research, creating original technology, and integrating all knowledges organically.

(D) Communication skills for global success

Have the communication skills to effectively express and transmit one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other team members.

Ha(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 investigate the essence of changes in society, environment and technology.

Have the skills to voluntarily make plans and learn throughout one's life.

ve sophisticated ability as a leader to contribute for the achievement the goal of team.

Key words

(S51010080)Japanese Industrial Internship Program[Japanese Industrial Internship Program]

Subject name[English]	Japanese Industrial Internship Program[Japanese Industrial Internship Program]				
Schedule number	S51010080	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	COM_DOC79015				

Objectives of class

博士後期課程2年次に，日本企業（地域の中堅・中小企業等）での1か月間程度の長期インターンシップを実施し，日本企業のものづくりの理念と方法論を体験的に学習することで，母国の企業と日本企業との橋渡し人材を育成することを目的とする。

In the second year of the doctoral program, the long-term internship for about one month is conducted at a Japanese industrial company (e.g., small and medium-sized enterprises in the neighboring areas). The aim is to develop human resources that can bridge between Japanese companies and their home country through hands-on learning of the manufacturing philosophy and methodology of Japanese industrial companies.

Contents of class

企業や研究機関などでの実践的な問題解決能力と技術を養うために，指導教員および企業指導責任者との密接なコミュニケーションを通じて，各専門分野での解決すべき研究開発課題を提供する。

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

Note:

If there will be any changes regarding Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus, the course content and evaluation of achievement are subject to change.

If there is any changes about a class schedule, it will be informed via Google Classroom or KYOMU JOHO SYSTEM.

Self Preparation and Review

インターンシップ開始前に実施内容について指導教員と十分に話し合うこと。

Students are expected to discuss a preferable internship topic with academic supervisors before the starting internship.

Related subjects

特になし

N／A

Notes for textbook

実務訓練先の担当者の指示に従うこと。

Follow instructions provided by your company/institutional supervisors.

Notes for reference

特になし

N／A

Goals to be achieved

特に企業・研究機関等で実務に従事することによって，実践的な問題解決能力・計画力・創造力等を体得するとともに，日本企業のものづくりの理念と方法論の基礎知識を修得する。

While engaging practical activities in an industrial company or research institution, students are expected to improve the practical problem-solving ability, planning ability, and creativity, as well as gaining basic knowledge about the manufacturing philosophy and methodology of Japanese industrial companies.

Evaluation of achievement

実務訓練担当者の評価書および/若しくは学生の最終成果報告書（レポート）によって総合的に評価する。

評価S：90点以上，評価A：80点以上，評価B：70点以上，評価C：60点以上

Comprehensive evaluation based on evaluation sheets by company/institutional supervisors and/or students' final reports.

Grade levels are C (60% - less than 70%), B (70%- less than 80%), A (80% - less than 90 %) and S (90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

特になし

N／A

Other information
詳細については指導教員に問い合わせること。
For any questions, contact your supervisor.

Reference URL
特になし
N／A

Office hours
特になし
N／A

Relations to attainment objectives of learning and education
(B)技術者・研究者としての正しい倫理観と社会性
高度上級技術者・研究者としての専門的・倫理的責任を有し，社会における技術的課題を発見・設定・解決・評価する能力を身につけている
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，
課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

機械工学専攻
(B)技術者・研究者としての正しい倫理観と社会性
高度上級技術者・研究者としての専門的・倫理的責任を有し，社会における技術的課題を発見・設定・解決・評価する能力を身につけている
(C)高度な知識を統合的・発展的に活用できる実践力・創造力
機械工学およびその関連分野に関する高度な知識を修得し，それらを広範囲に有機的に連携させた研究開発方法論を体得することで，課題解決のための独創的な技術を創造し，実践できる能力を身につけている。

(B) Sound ethics and social awareness as highly advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as highly advanced-level engineers and researchers; and have the ability to discover, set,solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner

Graduate Program of Mechanical Engineering for Doctoral Degree
(B) Sound ethics and social awareness as highly advanced-level engineers and researchers
Be conscious of specialized and ethical responsibilities as highly advanced-level engineers and researchers; and have the ability to discover, set,solve and evaluate technical issues in society
(C) Practical and creative skills to utilize advanced knowledge in an integrated and progressive manner
Have advanced knowledge about mechanical engineering and related fields, and have ability to create and practice original techniquesfor problem solving by acquiring the research and development methodology that combines such knowledge in an extensive and organic manner

Key words
インターンシップ
Internship

(S51010090)Teaching Practice on Global Education[Teaching Practice on Global Education]

Subject name[English]	Teaching Practice on Global Education[Teaching Practice on Global Education]				
Schedule number	S51010090	**Subject area**	Advanced Mechanical Engineering	**Required or elective**	Required
Time of starting a course	1.5Years	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Mechanical Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	池松　峰男 IKEMATSU Mineo				
Numbering	COM_DOC71015				

Objectives of class

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

Contents of class

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

Self Preparation and Review

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Related subjects

N/A

N/A

Notes for textbook

N/A

N/A

Notes for reference

N/A

N/A

Goals to be achieved

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Evaluation of achievement

Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80

B: ≧70
C: ≧60
Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80
B: ≧70
C: ≧60

Examination

試験期間中には何も行わない
None during exam period

Details of examination

N/A
N/A

Other information

N/A
N/A

Reference URL

N/A
N/A

Office hours

Drop-in basis.
Drop-in basis.

Relations to attainment objectives of learning and education

機械工学専攻
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

Graduate Program of Mechanical Engineering for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; and the ability to comprehensively grasp the symbiosis between humans and nature aswell as public welfare
(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, and thehigh ability to contribute to the goals of the team as a leader

Key words

(S52010080)Japanese Industrial Internship Program[Japanese Industrial Internship Program]

Subject name[English]	Japanese Industrial Internship Program[Japanese Industrial Internship Program]				
Schedule number	S52010080	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	COM_DOC79015				

Objectives of class

博士後期課程2年次に，日本企業（地域の中堅・中小企業等）での1か月間程度の長期インターンシップを実施し，日本企業のものづくりの理念と方法論を体験的に学習することで，母国の企業と日本企業との橋渡し人材を育成することを目的とする。

In the second year of the doctoral program, the long-term internship for about one month is conducted at a Japanese industrial company (e.g., small and medium-sized enterprises in the neighboring areas). The aim is to develop human resources that can bridge between Japanese companies and their home country through hands-on learning of the manufacturing philosophy and methodology of Japanese industrial companies.

Contents of class

企業や研究機関などでの実践的な問題解決能力と技術を養うために，指導教員および企業指導責任者との密接なコミュニケーションを通じて，各専門分野での解決すべき研究開発課題を提供する。

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

Self Preparation and Review

インターンシップ開始前に実施内容について指導教員と十分に話し合うこと。

Students are expected to discuss a preferable internship topic with academic supervisors before the starting internship.

Related subjects

特になし

N／A

Notes for textbook

実務訓練先の担当者の指示に従うこと。

Follow instructions provided by your company/institutional supervisors.

Notes for reference

特になし

N／A

Goals to be achieved

特に企業・研究機関等で実務に従事することによって，実践的な問題解決能力・計画力・創造力等を体得するとともに，日本企業のものづくりの理念と方法論の基礎知識を修得する。

While engaging practical activities in an industrial company or research institution, students are expected to improve the practical problem-solving ability, planning ability, and creativity, as well as gaining basic knowledge about the manufacturing philosophy and methodology of Japanese industrial companies.

Evaluation of achievement

実務訓練担当者の評価書および/若しくは学生の最終成果報告書（レポート）によって総合的に評価する。
評価S：90点以上，評価A：80点以上，評価B：70点以上，評価C：60点以上

Comprehensive evaluation based on evaluation sheets by company/institutional supervisors and/or students' final reports.
Grade levels are C (60% - less than 70%), B (70%- less than 80%), A (80% - less than 90 %) and S (90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

特になし

N／A

Other information

詳細については指導教員に問い合わせること。

For any questions, contact your supervisor.

Reference URL
特になし
N／A

Office hours
特になし
N／A

Relations to attainment objectives of learning and education

Key words
インターンシップ
Internship

(S52010090)Teaching Practice on Global Education[Teaching Practice on Global Education]

Subject name[English]	Teaching Practice on Global Education[Teaching Practice on Global Education]				
Schedule number	S52010090	**Subject area**	Advanced Electrical and Electronic Information Engineering	**Required or elective**	Required
Time of starting a course	1.5Years	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Electrical and Electronic Information Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	池松　峰男 IKEMATSU Mineo				
Numbering	COM_DOC71015				

Objectives of class

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students
As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

Contents of class

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.
- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

Self Preparation and Review

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.
Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Related subjects

N/A
N/A

Notes for textbook

N/A
N/A

Notes for reference

N/A
N/A

Goals to be achieved

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures
Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Evaluation of achievement

Report (30%), Contribution (participation, presentation, etc.) (70%)

S: ≧90
A: ≧80
B: ≧70
C: ≧60
Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80
B: ≧70
C: ≧60

Examination

試験期間中には何も行わない
None during exam period

Details of examination

N/A
N/A

Other information

N/A
N/A

Reference URL

N/A
N/A

Office hours

Drop-in basis.
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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

Graduate Progaram of Engineering of Electrical and ElectronicInformation Engineering for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; the ability to consider the symbiosis between humans and nature as well as publicwelfare
(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

Key words

(S53010080)Japanese Industrial Internship Program[Japanese Industrial Internship Program]

Subject name[English]	Japanese Industrial Internship Program[Japanese Industrial Internship Program]				
Schedule number	S53010080	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	COM_DOC79015				

Objectives of class

博士後期課程2年次に，日本企業（地域の中堅・中小企業等）での1か月間程度の長期インターンシップを実施し，日本企業のものづくりの理念と方法論を体験的に学習することで，母国の企業と日本企業との橋渡し人材を育成することを目的とする。

In the second year of the doctoral program, the long-term internship for about one month is conducted at a Japanese industrial company (e.g., small and medium-sized enterprises in the neighboring areas). The aim is to develop human resources that can bridge between Japanese companies and their home country through hands-on learning of the manufacturing philosophy and methodology of Japanese industrial companies.

Contents of class

企業や研究機関などでの実践的な問題解決能力と技術を養うために，指導教員および企業指導責任者との密接なコミュニケーションを通じて，各専門分野での解決すべき研究開発課題を提供する。

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

Self Preparation and Review

インターンシップ開始前に実施内容について指導教員と十分に話し合うこと。

Students are expected to discuss a preferable internship topic with academic supervisors before the starting internship.

Related subjects

特になし

N／A

Notes for textbook

実務訓練先の担当者の指示に従うこと。

Follow instructions provided by your company/institutional supervisors.

Notes for reference

特になし

N／A

Goals to be achieved

特に企業・研究機関等で実務に従事することによって，実践的な問題解決能力・計画力・創造力等を体得するとともに，日本企業のものづくりの理念と方法論の基礎知識を修得する。

While engaging practical activities in an industrial company or research institution, students are expected to improve the practical problem-solving ability, planning ability, and creativity, as well as gaining basic knowledge about the manufacturing philosophy and methodology of Japanese industrial companies.

Evaluation of achievement

実務訓練担当者の評価書および/若しくは学生の最終成果報告書（レポート）によって総合的に評価する。

評価S：90点以上，評価A：80点以上，評価B：70点以上，評価C：60点以上

Comprehensive evaluation based on evaluation sheets by company/institutional supervisors and/or students' final reports.

Grade levels are C (60% - less than 70%), B (70%- less than 80%), A (80% - less than 90 %) and S (90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

特になし

N／A

Other information

詳細については指導教員に問い合わせること。

For any questions, contact your supervisor.

Reference URL 特になし N／A
Office hours 特になし N／A
Relations to attainment objectives of learning and education
Key words インターンシップ Internship

(S53010090)Teaching Practice on Global Education[Teaching Practice on Global Education]

Subject name[English]	Teaching Practice on Global Education[Teaching Practice on Global Education]				
Schedule number	S53010090	**Subject area**	Advanced Computer Science and Engineering	**Required or elective**	Required
Time of starting a course	1.5Years	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Computer Science and Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	池松　峰男 IKEMATSU Mineo				
Numbering	COM_DOC71015				

Objectives of class

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

Contents of class

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

Self Preparation and Review

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Related subjects

N/A

N/A

Notes for textbook

N/A

N/A

Notes for reference

N/A

N/A

Goals to be achieved

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Evaluation of achievement

Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90

A: ≧80
B: ≧70
C: ≧60
Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80
B: ≧70
C: ≧60

Examination

試験期間中には何も行わない
None during exam period

Details of examination

N/A
N/A

Other information

N/A
N/A

Reference URL

N/A
N/A

Office hours

Drop-in basis.
Drop-in basis.

Relations to attainment objectives of learning and education

情報・知能工学専攻
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

Graduate Program of Computer Science and Engineering for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare
(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.Havesophisticated ability as a leader to contribute for the achievement the goal of team.

Key words

(S54010100)Japanese Industrial Internship Program[Japanese Industrial Internship Program]

Subject name[English]	Japanese Industrial Internship Program[Japanese Industrial Internship Program]				
Schedule number	S54010100	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	COM_DOC79015				

Objectives of class

博士後期課程2年次に，日本企業（地域の中堅・中小企業等）での1か月間程度の長期インターンシップを実施し，日本企業のものづくりの理念と方法論を体験的に学習することで，母国の企業と日本企業との橋渡し人材を育成することを目的とする。

In the second year of the doctoral program, the long-term internship for about one month is conducted at a Japanese industrial company (e.g., small and medium-sized enterprises in the neighboring areas). The aim is to develop human resources that can bridge between Japanese companies and their home country through hands-on learning of the manufacturing philosophy and methodology of Japanese industrial companies.

Contents of class

企業や研究機関などでの実践的な問題解決能力と技術を養うために，指導教員および企業指導責任者との密接なコミュニケーションを通じて，各専門分野での解決すべき研究開発課題を提供する。

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

Self Preparation and Review

インターンシップ開始前に実施内容について指導教員と十分に話し合うこと。

Students are expected to discuss a preferable internship topic with academic supervisors before the starting internship.

Related subjects

特になし

N／A

Notes for textbook

実務訓練先の担当者の指示に従うこと。

Follow instructions provided by your company/institutional supervisors.

Notes for reference

特になし

N／A

Goals to be achieved

特に企業・研究機関等で実務に従事することによって，実践的な問題解決能力・計画力・創造力等を体得するとともに，日本企業のものづくりの理念と方法論の基礎知識を修得する。

While engaging practical activities in an industrial company or research institution, students are expected to improve the practical problem-solving ability, planning ability, and creativity, as well as gaining basic knowledge about the manufacturing philosophy and methodology of Japanese industrial companies.

Evaluation of achievement

実務訓練担当者の評価書および/若しくは学生の最終成果報告書（レポート）によって総合的に評価する。

評価S：90点以上，評価A：80点以上，評価B：70点以上，評価C：60点以上

Comprehensive evaluation based on evaluation sheets by company/institutional supervisors and/or students' final reports.

Grade levels are C (60% - less than 70%), B (70%- less than 80%), A (80% - less than 90 %) and S (90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

特になし

N／A

Other information

詳細については指導教員に問い合わせること。

For any questions, contact your supervisor.

Reference URL 特になし N／A
Office hours 特になし N／A
Relations to attainment objectives of learning and education
Key words インターンシップ Internship

(S54010110)Teaching Practice on Global Education[Teaching Practice on Global Education]

Subject name[English]	Teaching Practice on Global Education[Teaching Practice on Global Education]				
Schedule number	S54010110	**Subject area**	Advanced Applied Chemistry and Life Science	**Required or elective**	Required
Time of starting a course	1.5Years	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Applied Chemistry and Life Science			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	池松 峰男 IKEMATSU Mineo				
Numbering	COM_DOC71015				

Objectives of class

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

Contents of class

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

Self Preparation and Review

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Related subjects

N/A

N/A

Notes for textbook

N/A

N/A

Notes for reference

N/A

N/A

Goals to be achieved

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Evaluation of achievement

Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90

A: ≧80
B: ≧70
C: ≧60
Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80
B: ≧70
C: ≧60

Examination

試験期間中には何も行わない
None during exam period

Details of examination

N/A
N/A

Other information

N/A
N/A

Reference URL

N/A
N/A

Office hours

Drop-in basis.
Drop-in basis.

Relations to attainment objectives of learning and education

応用化学・生命工学専攻
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

Graduate Program of Applied Chemistry and Life Science for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare
(D) Communication skills for global success
Have the communication skills to effectively express and disseminate one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other teammembers as well as leadership ability to contribute to the team's achievements

Key words

(S55010080)Japanese Industrial Internship Program[Japanese Industrial Internship Program]

Subject name[English]	Japanese Industrial Internship Program[Japanese Industrial Internship Program]				
Schedule number	S55010080	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	Fall term	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D2
Charge teacher name[Roman alphabet mark]	柴田　隆行 SHIBATA Takayuki				
Numbering	COM_DOC79015				

Objectives of class

博士後期課程2年次に，日本企業（地域の中堅・中小企業等）での1か月間程度の長期インターンシップを実施し，日本企業のものづくりの理念と方法論を体験的に学習することで，母国の企業と日本企業との橋渡し人材を育成することを目的とする。

In the second year of the doctoral program, the long-term internship for about one month is conducted at a Japanese industrial company (e.g., small and medium-sized enterprises in the neighboring areas). The aim is to develop human resources that can bridge between Japanese companies and their home country through hands-on learning of the manufacturing philosophy and methodology of Japanese industrial companies.

Contents of class

企業や研究機関などでの実践的な問題解決能力と技術を養うために，指導教員および企業指導責任者との密接なコミュニケーションを通じて，各専門分野での解決すべき研究開発課題を提供する。

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

Self Preparation and Review

インターンシップ開始前に実施内容について指導教員と十分に話し合うこと。

Students are expected to discuss a preferable internship topic with academic supervisors before the starting internship.

Related subjects

特になし

N／A

Notes for textbook

実務訓練先の担当者の指示に従うこと。

Follow instructions provided by your company/institutional supervisors.

Notes for reference

特になし

N／A

Goals to be achieved

特に企業・研究機関等で実務に従事することによって，実践的な問題解決能力・計画力・創造力等を体得するとともに，日本企業のものづくりの理念と方法論の基礎知識を修得する。

While engaging practical activities in an industrial company or research institution, students are expected to improve the practical problem-solving ability, planning ability, and creativity, as well as gaining basic knowledge about the manufacturing philosophy and methodology of Japanese industrial companies.

Evaluation of achievement

実務訓練担当者の評価書および/若しくは学生の最終成果報告書（レポート）によって総合的に評価する。

評価S：90点以上，評価A：80点以上，評価B：70点以上，評価C：60点以上

Comprehensive evaluation based on evaluation sheets by company/institutional supervisors and/or students' final reports.

Grade levels are C (60% - less than 70%), B (70%- less than 80%), A (80% - less than 90 %) and S (90% or over).

Examination

試験期間中には何も行わない

None during exam period

Details of examination

特になし

N／A

Other information

詳細については指導教員に問い合わせること。

For any questions, contact your supervisor.

Reference URL 特になし N／A
Office hours 特になし N／A
Relations to attainment objectives of learning and education
Key words インターンシップ Internship

(S55010090)Teaching Practice on Global Education[Teaching Practice on Global Education]

Subject name[English]	Teaching Practice on Global Education[Teaching Practice on Global Education]				
Schedule number	S55010090	**Subject area**	Advanced Architecture and Civil Engineering	**Required or elective**	Required
Time of starting a course	1.5Years	**Day of the week,period**	Intensive	**Credit(s)**	1
Faculty	Graduate Program for Doctoral Degree			**Subject grade**	2～
Department Offered	Architecture and Civil Engineering			**Beggining grade**	D1
Charge teacher name[Roman alphabet mark]	池松　峰男 IKEMATSU Mineo				
Numbering	COM_DOC71015				

Objectives of class

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

As a result of this course, students will develop:
-English presentation skills relating to course topics
-STEM education skills applying design thinking
-Intercultural communication skills to give lectures for multi-cultural students

Contents of class

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

- Class preparation (orientation, lecture about the presentation, etc.)
- Students will provide active learning lectures for TUT students and local high school students.

Self Preparation and Review

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Students are required to facilitate communication by group members for discussion and preparation of presentation materials in English.

Related subjects

N/A

N/A

Notes for textbook

N/A

N/A

Notes for reference

N/A

N/A

Goals to be achieved

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Students will be able to:
-provide lectures using English presentation slide
-give lectures to develop students' STEM skills applying design thinking
-understand intercultural communication to accomplish these lectures

Evaluation of achievement

Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90

A: ≧80
B: ≧70
C: ≧60
Report (30%), Contribution (participation, presentation, etc.) (70%)
S: ≧90
A: ≧80
B: ≧70
C: ≧60

Examination

試験期間中には何も行わない
None during exam period

Details of examination

N/A
N/A

Other information

N/A
N/A

Reference URL

N/A
N/A

Office hours

Drop-in basis.
Drop-in basis.

Relations to attainment objectives of learning and education

建築・都市システム学専攻
(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るグローバルな感性を持ち，人間と自然との共生，公共の福祉について俯瞰的にとらえる能力を身につけている。
(D)グローバルに活躍できるコミュニケーション力
グローバルに変化する社会が抱える課題にチームとして協調して取り組む中で，自らの考えや成果を効果的に表現・発信するコミュニケーション力と，リーダーとしてチームの目標達成に寄与できる高い能力を身につけている。

Graduate Program of Architecture and Civil Engineering for Doctoral Degree
(A) Personality and outlook with a broad perspective
Have an international mindset to see human society from various angles with a global perspective; and the ability to consider the symbiosis between humans and nature as well as publicwelfare with a wide view.
(D) Communication skills for global success
Have the communication skills to effectively express and transmit one's own ideas and results while working on the issues faced by a globally changing society in cooperation with other teammembers.Have sophisticated ability as a leader to contribute for the achievement the goal of team.

Key words