

Syllabus

**International Doctoral Degree
Program
(2022-Spring Term)**

(D51030010)Advanced Mechanical Systems[Advanced Mechanical Systems]

Subject name[English]	Advanced Mechanical Systems[Advanced Mechanical Systems]				
Schedule number	D51030010	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Spring 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]	河村 庄造, 足立 忠晴, 竹市 嘉紀, 松原 真己 KAWAMURA Shozo, ADACHI Tadaharu, TAKEICHI Yoshinori, MATSUBARA Masami				
Numbering	MEC.DOC73025				
Objectives of class					
The class aims to give advanced knowledge on solid mechanics, vibration engineering or tribology.					
Contents of class					
Vibration engineering of existing structures and machine elements is lectured from the faculty member with experiences as mechanical and plant engineers of a tire company.					
01 week: Guidance of this lecture					
From 02 to 04 week: Prof. S. Kawamura Vibration engineering of machines and structures is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical modeling and simulation of structural vibration are understood through discussion based on the presentations. Topics: Vibration engineering, Modeling and simulation of dynamic phenomena and so on.					
From 05 to 07 week (on-demand): Prof. T. Adachi Mechanics of solids and structures including materials science is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the mechanics, and must present them. Practical mechanics and design of engineering materials and mechanical structures are understood through discussion based on the presentations. Topics: Mechanics of solids and structures, Mechanical properties of materials, Design of mechanical components and so on.					
From 08 to 09 week (on-demand): Associate Professor Y. Takeichi Fundamentals of tribology including materials science are lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the tribology, and must present them. Practical lubrication engineering and design of sliding mechanical components are understood through discussion based on the presentations. Topics: Tribology, Lubrication engineering, Surface properties, Wear of materials, Tribological coatings and so on.					
From 10 to 11 week (on-demand): Associate Professor M. Matsubara Vibration engineering of existing structures and machine elements is lectured with current topics. Each student is assigned some examinations, and/or reviewing current papers related to the vibration engineering, and must present them. Practical data analysis of vibration is understood through discussion based on the presentations. Topics: Vibration engineering, Vibration data analysis, Machine elements and so on.					
From 12 to 14 week (face to face): 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					
Review each lecture and prepare for the next class with reference to the textbook.					
Related subjects					
Fundamental knowledge on solid mechanics, vibration engineering or tribology.					
Notes for textbook					
Handouts will be prepared					
Notes for reference					
N/A					
Goals to be achieved					
get advanced knowledge on solid mechanics, vibration engineering or tribology.					

Evaluation of achievement

A comprehensive report(70%) and discussion(30%)

S: Achieved all goals and obtained total points of reports, 90 or higher (out of 100 points).

A: Achieved 80% of goals and obtained total points of reports, 80 or higher (out of 100 points).

B: Achieved 70% of goals and obtained total points of reports, 70 or higher (out of 100 points).

C: Achieved 60% of goals and obtained total points of reports, 60 or higher (out of 100 points).

Examination

その他

Other

Details of examination

Report and oral presentation.

Other information

Contact Prof Adachi by email before the first day of class.

Tadaharu Adachi: Room D-305, E-mail: adachi.tadaharu.or@tut.jp

Shozo Kawamura: Room D-404, E-Mail: kawamura.shozo.qk@tut.jp

Yoshinori Takeichi: Room D-304, E-Mail: takeichi@tut.jp

Masami Matsubara: Room D-403, E-mail: matsubara.masami.od@tut.jp

Reference URL

N/A

Office hours

Ask us 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.

Key words

実務経験

solid mechanics, vibration engineering, tribology

(D51030030)Advanced Manufacturing Processes[Advanced Manufacturing Processes]

Subject name[English]	Advanced Manufacturing Processes[Advanced Manufacturing Processes]				
Schedule number	D51030030	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Spring 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]	伊崎 昌伸, 横山 誠二, 安井 利明 IZAKI Masanobu, YOKOYAMA Seiji, YASUI Toshiaki				
Numbering	MEC_DOC74025				
Objectives of class					
1. 材料の作製と機能(伊崎) 本授業は固体物理学および化学熱力学に立脚して材料ならびにその薄膜の形成技術を取り扱うとともに、材料の組織・構造・エネルギー状態と材料の物理・化学的性質の関係を掘り下げ、機能向上のための技術と科学を学ぶ。					
2. 接合プロセス 最先端の接合プロセス、および表面改質プロセスの原理および実用技術を学ぶ。本授業は、力学、固体物理学、化学熱力学および移動現象論を網羅している。					
3. 材料創製の物理化学 材料、主に、鉄鋼材料製造プロセスにおける反応プロセスについて学ぶ。					
1. Manufacturing and function of materials(izaki) This subject deals with the manufacturing process of materials and the thin films based on solid state physics and chemical thermodynamics, and the science and technology for enhancing the performance of materials and the thin films are learned by understanding the fundamental aspects of the characteristics.					
2. Joining process Students will learn principle and practical technology of advanced joining process and surface modification process. This subject incorporates the mechanics, solid state physics, chemical thermodynamics, and transport phenomena.					
3. Physical chemistry for material chemical processing This subject aims to learn physical chemistry (chemical equilibrium and kinetics) for material chemical processing.					
Contents of class					
(オンデマンド) 第1週: 材料の製造と加工1-無機固体生産に関わる化学熱力学(伊崎)					
(オンデマンド) 第2週: 材料の製造と加工2-化学熱力学を用いた生産プロセス設計(伊崎)					
(対面) 第3週: 材料の製造と加工3-無機固体の固体物理学(電子論)(伊崎)					
(オンデマンド) 第4週: 材料の製造と加工4-無機固体の固体物理学(結晶学)(伊崎)					
(オンデマンド) 第5-6週: 材料の製造と加工5-無機固体の溶液プロセスによる製造と応用(伊崎)					
(対面) 第7週: 材料の製造と加工6-高温度における物理化学(横山)					
(オンデマンド) 第8週: 材料の製造と加工7-冶金反応における平衡(横山)					
(オンデマンド) 第9週: 材料の製造と加工8-冶金反応における反応速度(横山)					
(対面) 第10週: 材料の製造と加工9-鉄鋼製錬プロセス(横山)					
(対面) 第11週: 材料の製造と加工10-資源とリサイクル(横山)					
(オンデマンド) 第12週: 接合加工と表面処理プロセス1-序論(安井)					
(オンデマンド) 第13週: 接合加工プロセス2-バルク接合プロセス(安井)					
(対面) 第14週: 接合加工プロセス3-粒子積層プロセス(安井)					
(対面) 第15-16週: 接合加工プロセス4-気相蒸着プロセス(安井)					
「本学の新型コロナウイ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。					
(On demand) 1st week: Production and manufacturing of materials1 - Chemical thermodynamics in manufacturing.(Izaki)					
(On demand) 2nd week: Production and manufacturing of materials 2 - Process design based on thermodynamic (izaki)					
(Face-to-face) 3rd week: Production and manufacturing of materials 3 - Solid state physics of inorganic solid (energy state).(Izaki)					
(On demand) 4th week: Production and manufacturing of materials 4 - Solid state physics of inorganic solid (crystal).(Izaki)					

(On demand)5-6th week: Production and manufacturing of materials 5 – Preparation and application of inorganic solid.(Izaki)
 (Face-to-face) 7th week: Production and manufacturing of materials 6 – Physical chemistry at high temperature.(Yokoyama)
 (On demand)8th week: Production and manufacturing of materials 7 – Equilibrium of metallurgical reaction.(Yokoyama)
 (On demand)9th week: Production and manufacturing of materials 8 – Reaction rate of metallurgical reaction.(Yokoyama)
 (Face-to-face) 10th week: Production and manufacturing of materials 9 – Process of iron- and steel-making.(Yokoyama)
 (Face-to-face) 11th week: Production and manufacturing of materials 10 – Resource and recycling.(Yokoyama)
 (On demand) 12th week: Joining process 1 – Introduction of joining process. (Yasui)
 (On demand) 13th week: Joining process 2 – Bulk joining process. (Yasui)
 (Face-to-face) 14th week: Joining process 3 – Particle deposition process. (Yasui)
 (Face-to-face) 15-16th week: Joining process 4 – Vapor deposition process. (Yasui)
 "As a result of the change in our activity standards for preventing the spread of new coronavirus infection at our university, the evaluation method of class contents and grades may change."
 When the class form changes, we will notify you from Google Classroom or the Academic Affairs Information System.

Self Preparation and Review

授業後の復習、授業前の予習が重要。各自、それぞれ予習・復習を90分づつ行うこと。

Review after every class, and read the text before next class Students must provide 90 minutes for preparation and review of each class.

Related subjects

接合加工プロセス、表面加工学、材料科学、材料物理化学、材料解析

Joining process, surface process engineering, materials science, Physical chemistry of material, material analysis

Notes for textbook

資料を配布する。
Text will be distributed.

Reference1	Book title	Principles of Extractive Metallurgy			ISBN	0470115394
	Author	Rosenqvist	Publisher	Tapir Academic Press	Publish year	2006
Reference2	Book title	Growth and Transport in Nanostructured Materials: The Fundamentals of PVD, CVD and ALD			ISBN	3319246704
	Author	Angel Yanguas-Gil	Publisher	Springer	Publish year	2015
Reference3	Book title	Solid State Physics			ISBN	0123850304
	Author	Giuseppe Grosso, Giuseppe Pastori Parravicini	Publisher	Academic Press	Publish year	2013

Notes for reference

とくになし。
N/A

Goals to be achieved

- 1) 結晶構造と電子状態を理解していること。
 - 2) 蒸気圧、活量、pH、電位を理解していること。
 - 3) 反応の平衡と速度論を理解していること。
 - 4) 都市鉱山、リサイクルを理解していること。
 - 5) 金属とセラミックスの接合に関する原理と力学を理解していること。
 - 6) 薄膜および厚膜の製造プロセスの原理、力学、特性を理解していること。
 - 7) 真空技術や平均自由行程の概念を理解していること。
 - 8) プラズマの発生とその応用を理解していること。
- 1) To understand crystal structure and electron state.
 - 2) To understand evaporation pressure, activity, pH, electron potential.
 - 3) To comprehend equilibrium and kinetics of reaction.
 - 4) To comprehend urban mine and recycling.
 - 5) To understand principles and mechanics on joining of metals and ceramics.
 - 6) To understand principles, mechanics and characteristics of preparation process of thin and thick coating.
 - 7) To understand vacuum technology and concept of mean free path.
 - 8) To understand plasma generation and its application.

Evaluation of achievement

- S: 達成目標をすべて達成しており、かつレポートの合計点(100点満点)が90点以上
 A: 達成目標を○%達成しており、かつレポートの合計点(100点満点)が80点以上
 B: 達成目標を○%達成しており、かつレポートの合計点(100点満点)が70点以上

C: 達成目標を〇%達成しており, かつレポートの合計点(100点満点)が60点以上
※ただし, 過年度生が履修した場合には, 従来(A~C)の評価基準が適用される。

Each instructor will give students assignments. Average score is used for evaluation.

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

S: Achieved all goals and obtained total points of reports, 90 or higher (out of 100 points).

A: Achieved all goals and obtained total points of reports, 80 or higher (out of 100 points).

B: Achieved 80 % of goals and obtained total points of reports, 70 or higher (out of 100 points).

C: Achieved 60 % of goals and obtained total points of reports, 60 or higher (out of 100 points).

(The conventional evaluation standard of (A - C) is applied for a past fiscal year student.)

Examination

レポートで実施

By Report

Details of examination

N/A

Other information

伊崎昌伸(部屋 D-505,内線 6694,e-mail:m-izaki@me.tut.ac.jp)

横山誠二(部屋 D-507,内線 6696,e-mail:yokoyama@me.tut.ac.jp)

安井利明(部屋 D-601,内線 6703,e-mail:yasui@tut.jp)

Masanobu Izaki (D-505,ext.6694, e-mail:m-izaki@me.tut.ac.jp)

Seiji Yokoyama (D-507, ext.6696, e-mail:yokoyama@me.tut.ac.jp)

Toshiaki Yasui (D-601, ext.6703,e-mail:yasui@tut.jp)

Reference URL

特になし。

N/A

Office hours

いつでも可。ただし、事前にメールで連絡すること。

Any time, but inform us your visit by e-mail before your visit.

Relations to attainment objectives of learning and education

材料と加工法の技術開発する広範囲な実践力と能力を養う。

A broad range of expertise and the ability to carry out technological development in materials and manufacturing.

Key words

薄膜、コーティング、蒸発、活量、スプレー加工、移動現象論、熱力学

thin solid film, coating, evaporation, activity, spray forming, transport phenomena, thermodynamics

(D51030070)Advanced Energy Engineering[Advanced Energy Engineering]

Subject name[English]	Advanced Energy Engineering[Advanced Energy Engineering]				
Schedule number	D51030070	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Fri.4~4	Credit(s)	2
Faculty	Graduate Program for Doctoral Degree			Subject grade	1~
Department Offered	Mechanical Engineering			Begging grade	D1
Charge teacher name[Roman alphabet mark]	鈴木 孝司, 中村 祐二, 松岡 常吉, 土井 謙太郎 SUZUKI Takashi, NAKAMURA Yuji, MATSUOKA Tsuneyoshi, DOI Kentaro				
Numbering	MEC_DOC76025				
Objectives of class					
The aim of the present lecture is to obtain advanced knowledge on the transport of thermal energy and the combustion of gases and solids.					
Contents of class					
1st week (Nakamura, face-to-face): Introduction of scaling law for thermo-fluid engineering					
2nd week (Nakamura, face-to-face): Dimensional analysis / Buckingham pi-theorem					
3rd week (Nakamura, face-to-face): Large-scale transport phenomena					
4th week (Nakamura, face-to-face): Meno-scale transport phenomena					
5th week (Doi, face-to-face): Introduction to microscale transport phenomena 1					
6th week (Doi, face-to-face): Introduction to microscale transport phenomena 2					
7th week (Doi, face-to-face): Fuel cells					
8th week (Doi, face-to-face): Micro- and nanoscale thermofluid technologies					
9th week (Suzuki, face-to-face): Fundamentals of atomization					
10th week (Suzuki, face-to-face): Parameters and measuring method of atomization					
11th week (Suzuki, face-to-face): Numerical simulation of atomization (1)					
12th week (Suzuki, face-to-face): Numerical simulation of atomization (2)					
13th week (Matsuoka, face-to-face): Combustion instability					
14th week (Matsuoka, face-to-face): Diffusive-thermal instability					
15th week (Matsuoka, face-to-face): Pattern formation of reaction-diffusion system (1)					
16th week (Matsuoka, face-to-face): Pattern formation of reaction-diffusion system (2)					
(*) 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.					
(*) basically the class will be operated by face-to-face (in-person) style, however, it would be subjected to change to on-demand type based on the situation. Any change will be notified to students personally.					
Self Preparation and Review					
Students MUST be pre-studied the related area, especially for applied mathematics, fluid dynamics and thermodynamics (advance level is strongly preferred).					
To prepare for and review the lecture for around 90 minutes each.					
Related subjects					
Applied mathematics, fluid dynamics, thermodynamics for advanced level.					
Basic combustion (preferred)					
Notes for textbook					
Instructors will provide the materials, if necessary.					
Reference1	Book title	The Molecular Theory of Gases and Liquids		ISBN	
	Author	J.O. Hirschfelder, C.F. Curtiss, R.B. Bird	Publisher	John Wiley and Sons	Publish year 1954
Reference2	Book title	Combustion Physics		ISBN	
	Author	C.K. Law	Publisher	Cambridge University Press	Publish year 2006
Reference3	Book title	Combustion Theory		ISBN	

	Author	F.A. Williams	Publisher	Addison-Wesley	Publish year	1985
Notes for reference						
N.A.						
Goals to be achieved						
Understanding the scaling law for thermo-fluid problem						
Understanding the microscale Transport Phenomena						
Understanding the liquid atomization						
Understanding the combustion instability						
Evaluation of achievement						
Assignments and discussion (several assignments are requested during the term): 100%						
[Evaluation basis]						
Students who attend all classes will be evaluated as follows:						
S: Achieved all goals and obtained total points of exam and reports, 90 or higher (out of 100 points).						
A: Achieved 80 % goals and obtained total points of exam and reports, 80 or higher (out of 100 points).						
B: Achieved 70 % of goals and obtained total points of exam and reports, 70 or higher (out of 100 points).						
C: Achieved 60 % of goals and 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						
N/A						
Other information						
N/A						
Reference URL						
N/A						
Office hours						
Anytime when instructor is available: send mail to instructor to book your time for personal meeting						
Relations to attainment objectives of learning and education						
N/A						
Key words						
Thermo-fluid engineering, Scaling law, microscale transport phenomena, Liquid atomization, Combustion instability						

(D51030110)Advanced Mechatronics[Advanced Mechatronics]

Subject name[English]	Advanced Mechatronics[Advanced Mechatronics]				
Schedule number	D51030110	Subject area	Advanced Mechanical Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Thu.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]	佐藤 海二, 佐野 滋則, 高木 賢太郎 SATO Kajji, SANO Shigenori, TAKAGI Kentaro				
Numbering	MEC_DOC75025				
Objectives of class					
本講義を履修することによって、知能ロボットの基礎となるメカニズム、アクチュエータ、計測制御技術の基礎知識を身につける。 Students will acquire the basic knowledge of mechanisms, actuators, measurement and control methods which are fundamental and useful for intelligent robots by taking this course.					
Contents of class					
以下を予定している。 第1週(回)~第5週(回):高木, 第6週(回)~第10週(回):佐野, 第11週(回)~第15週(回):佐藤 (対面) 第1週(回)... メカトロニクスシステムとモデル化手法(1) (オンデマンド) 第2週(回)... メカトロニクスシステムとモデル化手法(2) (オンデマンド) 第3週(回)... メカトロニクスシステムとモデル化手法(3) (オンデマンド) 第4週(回)... メカトロニクスシステムとモデル化手法(4) (オンデマンド) 第5週(回)... メカトロニクスシステムとモデル化手法(5) (対面) 第6週(回)... システム同定・モデル検証(1) (オンデマンド) 第7週(回)... システム同定・モデル検証(2) (オンデマンド) 第8週(回)... システム同定・モデル検証(3) (オンデマンド) 第9週(回)... システム同定・モデル検証(4) (オンデマンド) 第10週(回)... システム同定・モデル検証(5) (対面) 第11週(回)... 精密運動システム(1) (オンデマンド) 第12週(回)... 精密運動システム(2) (オンデマンド) 第13週(回)... 精密運動システム(3) (オンデマンド) 第14週(回)... 精密運動システム(4) (オンデマンド) 第15週(回)... 精密運動システム(5)					
<p>本学の新型コロナウイ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。</p> <p>授業実施形態が変更になる場合は、GoogleClassroom や教務情報システムより通知します。</p> <p>The following contents are provided;</p> <p>1st-5th: Prof.Takagi, 6th-10th: Prof.Sano, 11th-15th: Prof.Sato</p> <p>(face to face) 1st week/time ... Mechatronics systems and modeling methods (1) (on-demand) 2nd week/time ... Mechatronics systems and modeling methods (2) (on-demand) 3rd week/time ... Mechatronics systems and modeling methods (3) (on-demand) 4th week/time ... Mechatronics systems and modeling methods (4) (on-demand) 5th week/time ... Mechatronics systems and modeling methods (5) (face to face) 6th week/time ... System identification and Validation(1) (on-demand) 7th week/time ... System identification and Validation(2) (on-demand) 8th week/time ... System identification and Validation(3) (on-demand) 9th week/time ... System identification and Validation(4) (on-demand) 10th week/time ... System identification and Validation(5) (face to face) 11th week/time ... Precision Motion System(1) (on-demand) 12th week/time ... Precision Motion System(2) (on-demand) 13th week/time ... Precision Motion System(3) (on-demand) 14th week/time ... Precision Motion System(4) (on-demand) 15th week/time ... Precision Motion System(5)</p>					
<p>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.</p> <p>If there is any changes about a class schedule, I will inform you on Google Classroom or KYOMU JOHO SYSTEM.</p>					

Self Preparation and Review

予習: 事前配信された講義資料を事前に熟読し, 関連事項について参考書などで理解を深めておくこと。(90分)

復習: 講義資料を読み返し, 参考書などを参照して理解しておくこと。(90分)

To carefully read the pre-delivered lecture materials in advance and understand related matters using reference books, etc..

To read back the lecture materials and understand them using reference books, etc..

To prepare for and review the lecture for around 90 minutes each.

Related subjects

線形代数, 微分方程式, 機構学, 計測工学, 制御理論, ロボティクス

Fundamentals of linear algebra, differential equation, mechanics, measurement and control theory, and robotics.

Notes for textbook

資料を配布する

Handouts will be prepared.

Notes for reference

特になし

N/A

Goals to be achieved

(1) 精密運動機構における構成要素の特性と効果的な利用方法を理解する

(2) ロボットのシステム同定の基礎を理解する

(3) メカトロニクスシステムを中心に動的システムのモデル化手法の基礎を理解する

(1) Understand characteristics of components and their effective use in precision motion mechanisms

(2) Understand the basic of system identification

(3) Understand methods for modeling dynamical systems including mechatronics systems

Evaluation of achievement

レポートによって 100%評価する

A: 80 点以上

B: 65 点以上

C: 55 点以上

Report (100 %)

A: Score of the report is 80 or higher.

B: Score of the report is 65 or higher.

C: Score of the report is 55 or higher.

Examination

レポートで実施

By Report

Details of examination

特になし

N/A

Other information

高木賢太郎, D-509, 6698, takagi.kentaro.op@tut.jp

佐野滋則, D-407, 6677, sano@me.tut.ac.jp

佐藤海二, D-408, 6676, sato@me.tut.ac.jp

Shigenori Sano, D-407, 6677, sano@me.tut.ac.jp

Kentaro Takagi, D-509, 6698, takagi.kentaro.op@tut.jp

Kaiji Sato, D-408, 6676, sato@me.tut.ac.jp

Reference URL

特になし

N/A

Office hours

質問は随時 Google Classroom のコメント機能を用いて受け付ける。質問への回答は、講義時間の前後に、まとめて回答する予定である。個人的な内容や急ぎの場合には教員に直接メール送付すること。

Write comment on Google Classroom if you have questions. The questions will be answered around the lecture time. In case you have personal or urgent questions, send email directly to the lecturers.

Relations to attainment objectives of learning and education

Key words

ロボット, 制御, モデル化, システム同定, センサ, アクチュエータ, 機構学, 機械システム

Robot, Control, Modeling, System identification, Sensor, Actuator, Mechanism, Mechanical system

(D52030010)Advanced Electronic Materials 1[Advanced Electronic Materials 1]

Subject name[English]	Advanced Electronic Materials 1[Advanced Electronic Materials 1]				
Schedule number	D52030010	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Wed.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]	内田 裕久, 八井 崇, 中村 雄一, 河村 剛 UCHIDA Hironaga, YATSUI Takashi, NAKAMURA Yuichi, KAWAMURA Go				
Numbering	ELC_DOC72025				
Objectives of class					
Objective of this subject is to learn about the forefront research and development on spin electronics and photonics in electronic materials, materials processing, and thermoelectrics.					
Contents of class					
1. Magnetics You will learn about fundamental to application of magnetics. 1) Crystal structure, 2) Magnetic materials, 3) Applications of magnetics					
2. Caloritronics You will learn about materials processing and thermoelectric conversion. 1) thermodynamics, 2) processing and 3) thermoelectrics					
3. Nanophotonics You will learn about nanophotonic materials and devices. 1) nanophotonic materials and 2) nanophotonic devices.					
4. Plasmonic photocatalysis You will learn about materials for plasmonic photocatalysis. 1) mechanisms, 2) materials and 3) applications					
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 next					
Related subjects					
N/A					
Notes for textbook					
Lecture materials will be distributed.					
Notes for reference					
N/A					
Goals to be achieved					
It aims at acquiring the broad knowledge of research and development by learning about the recent research and development in various fields.					
Evaluation of achievement					
The reports or tests will be set in each categories. The result is evaluated from the sum of those marks. Grades: S: 89-100, A:80-90, 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
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
Graduate Program of Engineering of Electrical and Electronic Information Engineering for Doctoral Degree
Key words
spin electronics, processing, thermoelectrics, plasmonics, photocatalysis, nanophotonics

(D52030040)Advanced Electrical Systems 2[Advanced Electrical Systems 2]

Subject name[English]	Advanced Electrical Systems 2[Advanced Electrical Systems 2]				
Schedule number	D52030040	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Wed.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]	稲田 亮史, 村上 義信 INADA Ryoji, MURAKAMI Yoshinobu				
Numbering	ELC_DOC73025				
Objectives of class					
<p>This lecture is implemented as an introduction to electrical energy systems and intended for students and other engineering disciplines. It is being useful as reference and self-study guide for the professional dealing with this important area. There are following three subcourses to choose from.</p> <p>This lecture is implemented as an introduction to electrical energy systems and intended for students and other engineering disciplines. It is being useful as reference and self-study guide for the professional dealing with this important area. There are following three subcourses to choose from.</p>					
Contents of class					
<p>Subcourse 1 (R. Inada)</p> <ol style="list-style-type: none"> 1. Introduction of Electrochemical Energy Conversion Devices 2. Fundamentals of Electrochemical Energy Conversion Devices 3. Lithium-Ion Secondary Batteries (1) 4. Lithium-Ion Secondary Batteries (2) 5. Recent Trend in Electrochemical Energy Conversion Devices <p>Subcourse 2 (Yo. Murakami)</p> <ol style="list-style-type: none"> 1. Introduction of Electric Energy Systems (1 week) 2. High Voltage Engineering and Electrical Insulation (2 weeks) 3. Fundamental Properties of Dielectrics and Electrical Insulating Materials(2 weeks) <p>Subcourse 1 (R. Inada)</p> <ol style="list-style-type: none"> 1. Introduction of Electrochemical Energy Conversion Devices 2. Fundamentals of Electrochemical Energy Conversion Devices 3. Lithium-Ion Secondary Batteries (1) 4. Lithium-Ion Secondary Batteries (2) 5. Recent Trend in Electrochemical Energy Conversion Devices <p>Subcourse 2 (Yo. Murakami)</p> <ol style="list-style-type: none"> 1. Introduction of Electric Energy Systems (1 week) 2. High Voltage Engineering and Electrical Insulation (2 weeks) 3. Fundamental Properties of Dielectrics and Electrical Insulating Materials(2 weeks) 					
Self Preparation and Review					
<p>Materials to be used in the lecture will be distributed from the lecturer before starting each subcourse. The lecturers will give a lecture on the premise that all the students have prepared this material before the lecture begins. It may not be possible to attend a lecture if you do not prepare materials.</p> <p>Materials to be used in the lecture will be distributed from the lecturer before starting each subcourse. The lecturers will give a lecture on the premise that all the students have prepared this material before the lecture begins. It may not be possible to attend a lecture if you do not prepare materials.</p>					
Related subjects					
<p>Basic electrical power engineering course is prerequisite.</p> <p>Basic electrical power engineering course is prerequisite.</p>					
Notes for textbook					

Materials will be prepared by the lecturer.

Materials will be prepared by the lecturer.

Reference1	Book title	Fuel Cell Systems Explained			ISBN	
	Author	J. Larminie and A. Dicks	Publisher	Wiley	Publish year	
Reference2	Book title	Lithium Ion Batteries: Science and Technologies			ISBN	
	Author	M. Yoshio, R.J. Brodd and A. Kozawa	Publisher	Springer-Verlag	Publish year	
Reference3	Book title	High Voltage Engineering			ISBN	
	Author	E. Kuffel, W. Zaengel and J. Kuffel	Publisher	Newnes	Publish year	

Notes for reference

N/A

Goals to be achieved

Evaluation of achievement

In final exams we will ask questions on the contents of all subcourses. We evaluate the results only based on the final exam scores. The result is evaluated in the following five stages.

S: If the score of the final exam is 90 points or more

A: If the score of the final exam is 80 points or more

B: If the score of the final exam is 70 points or more

C: If the score of the final exam is 60 points or more

D: If the score of the final exam is less than 60 points

In final exams we will ask questions on the contents of all subcourses. We evaluate the results only based on the final exam scores. The result is evaluated in the following five stages.

S: If the score of the final exam is 90 points or more

A: If the score of the final exam is 80 points or more

B: If the score of the final exam is 70 points or more

C: If the score of the final exam is 60 points or more

D: If the score of the final exam is less than 60 points

Examination

定期試験を実施(対面)

Examination(Face to Face)

Details of examination

In order to obtain good results in final exams, we will also conduct a small test at any time while each subcourse is offered. Therefore, it is desirable to prepare lecture materials beforehand and attend all the lectures.

In order to obtain good results in final exams, we will also conduct a small test at any time while each subcourse is offered. Therefore, it is desirable to prepare lecture materials beforehand and attend all the lectures.

Other information

N/A

N/A

Reference URL

N/A

N/A

Office hours

We do not have an office hour, so contact first by e-mail.

We do not have an office hour, so contact first by e-mail.

Relations to attainment objectives of learning and education

Key words

(D52030050)Advanced Microelectronics 1[Advanced Microelectronics 1]

Subject name[English]	Advanced Microelectronics 1[Advanced Microelectronics 1]				
Schedule number	D52030050	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Wed.1~1	Credit(s)	2
Faculty	Graduate Program for Doctoral Degree			Subject grade	1~
Department Offered	Electrical and Electronic Information Engineering			Beginning grade	D1
Charge teacher name[Roman alphabet mark]	澤田 和明, 石川 靖彦, 関口 寛人, 野田 俊彦 SAWADA Kazuaki, ISHIKAWA Yasuhiko, SEKIGUCHI Hiroto, NODA Toshihiko				
Numbering	ELC_DOC74025				
Objectives of class					
<p>From the viewpoint of deep understanding of advanced microelectronics, physics of semiconductors including material design and an example of latest device will be lectured.</p> <p>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.</p> <p>From the viewpoint of deep understanding of advanced microelectronics, physics of semiconductors including material design and an example of latest device will be lectured.</p> <p>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.</p>					
Contents of class					
<p>a) Physics and Properties of Semiconductors</p> <ul style="list-style-type: none"> Crystal growth and device processing Energy band engineering <ul style="list-style-type: none"> Alloy semiconductor Strain effect Superlattice Carrier transport phenomena <ul style="list-style-type: none"> Tunneling effect <p>b)Metal-Semiconductor Contacts</p> <ul style="list-style-type: none"> Schottky barrier Current transport processes Ohmic contact <p>c) Integrated circuits</p> <ul style="list-style-type: none"> device processing MEMS/NEMS Latest MOS FETs Current topics in IC/MEMS <p>a) Physics and Properties of Semiconductors</p> <ul style="list-style-type: none"> Crystal growth and device processing Energy band engineering <ul style="list-style-type: none"> Alloy semiconductor Strain effect Superlattice Carrier transport phenomena <ul style="list-style-type: none"> Tunneling effect <p>b)Metal-Semiconductor Contacts</p> <ul style="list-style-type: none"> Schottky barrier Current transport processes Ohmic contact <p>c) Integrated circuits</p> <ul style="list-style-type: none"> device processing 					

<p>MEMS/NEMS Latest MOS FETs Current topics in IC/MEMS</p>
<p>Self Preparation and Review 毎回の講義内容を復習するとともに、次週の内容についてテキスト等を参考に予習しておくこと Review each lecture and prepare for the next class with reference to the textbook.</p>
<p>Related subjects The basic knowledge on the quantum mechanics, thermodynamics, and electronics are desirable.</p> <p>Semiconductor Physics, Master course The basic knowledge on the quantum mechanics, thermodynamics, and electronics are desirable.</p> <p>Semiconductor Physics, Master course</p>
<p>Notes for textbook Physics of Semiconductr Devices S.M.Sze, Willy Physics of Semiconductr Devices S.M.Sze, Willy</p>
<p>Notes for reference 特になし N/A</p>
<p>Goals to be achieved (1) To understand fundamental aspects on microelectronics, and physics of semiconductors including material design. (2) To get the knowledge on the latest technologies on microelectronics. (1) To understand fundamental aspects on microelectronics, and physics of semiconductors including material design. (2) To get the knowledge on the latest technologies on microelectronics.</p>
<p>Evaluation of achievement Reports (100%) Reports (100%)</p>
<p>Examination レポートで実施 By Report</p>
<p>Details of examination</p>
<p>Other information K. Sawada (C-605) sawada@ee.tut.ac.jp Y. Ishikawa (C-607) ishikawa@ee.tut.ac.jp H. Sekiguchi (C-610) sekiguchi@ee.tut.ac.jp ext. 6744 T. Noda (C-611) noda-t@eiiris.tut.ac.jp ext. 6745 K. Sawada (C-605) sawada@ee.tut.ac.jp Y. Ishikawa (C-607) ishikawa@ee.tut.ac.jp H. Sekiguchi (C-610) sekiguchi@ee.tut.ac.jp ext. 6744 T. Noda (C-611) noda-t@eiiris.tut.ac.jp ext. 6745</p>
<p>Reference URL http://www.tut.ac.jp/english/introduction/02EE.pdf (department)</p> <p>http://www.int.ee.tut.ac.jp/ (devision)</p>

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

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

<http://www.int.ee.tut.ac.jp/>
(division)

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

Office hours

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

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

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

(D52030070)Advanced Information and Communication Systems 1[Advanced Information and Communication Systems 1]

Subject name[English]	Advanced Information and Communication Systems 1[Advanced Information and Communication Systems 1]				
Schedule number	D52030070	Subject area	Advanced Electrical and Electronic Information Engineering	Required or elective	Elective
Time of starting a course	Spring 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]	上原 秀幸, 竹内 啓悟 UEHARA Hideyuki, TAKEUCHI Keigo				
Numbering	ELC_DOC75025				
Objectives of class					
Students select one course from the following two courses: A first course is intended for learning mainly medium access control, multi-hop communications and other topics related to wireless networks. Students are required to give solutions of the problems which cause performance degradation. The other course is intended for learning point-to-point communication systems, multiuser communication systems, and multiple-input multiple-output (MIMO) systems in the physical layer of wireless communications. Students challenge a unified understanding of existing advanced schemes in wireless communications.					
Contents of class					
Course 1 provided by Prof. Uehara: 1. Medium access control protocols 2. Multi-hop communications 3. Ad hoc and sensor networks Course 2 provided by Prof. Takeuchi: 1. Point-to-point communication systems 2. Multiuser communication systems 3. MIMO systems 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					
Review each lecture and prepare for the next class with reference to the handouts.					
Related subjects					
The students who register for this lecture must have studied the Information and Communication Technology 1 and 2 (Uehara, & Takeuchi) in master course program, or its equivalent. All courses taken at other universities must be approved by the professors before registering for this course. Prerequisite of Course 1: Sufficient knowledge about the following; wireless digital modulation and demodulation, radio propagation characteristic, signal processing, probability, random variables and stochastic process. Prerequisite of Course 2: Deep understanding on modulation/demodulation, signal processing, probability theory, and information theory is prerequisite. In particular, sufficient knowledge about probability theory is required.					
Notes for textbook					
Instruct in 1st class.					
Notes for reference					
N/A					
Goals to be achieved					
Course 1: - Understand the mechanism of medium access control and multi-hop communications - Understand the characteristics of ad hoc and sensor networks					

- Present a solution or a new application for the above

Course 2:

- Understand the concept of detection, diversity, and channel uncertainty in point-to-point communication systems.
- Understand resource allocation and interference management in multiuser communication systems.
- Understand statistical channel models and basic multiuser detection schemes in MIMO systems.

Evaluation of achievement

Course 1: Marks are based on reports and presentations.

Course 2: Marks are based on reports and tests.

Examination

定期試験を実施(対面)

Examination(Face to Face)

Details of examination

N/A

Other information

For e-mail address information, visit <http://www.comm.ee.tut.ac.jp/>

Reference URL

<http://www.comm.ee.tut.ac.jp/>

Office hours

Appoint a time slot via email

Relations to attainment objectives of learning and education

(C)

Key words

wireless networks, medium access control, multi-hop, wireless communications, modulation/demodulation, MIMO

(D53030240)Computers and Education, Advanced[Computers and Education, Advanced]

Subject name[English]	Computers and Education, Advanced[Computers and Education, Advanced]				
Schedule number	D53030240	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period		Credit(s)	2
Faculty	Graduate Program for Doctoral Degree			Subject grade	1~
Department Offered	Computer Science and Engineering			Beggining grade	D1
Charge teacher name[Roman alphabet mark]	河合 和久 KAWAI Kazuhisa				
Numbering	CMP_DOC72025				
Objectives of class					
The purpose of the class is to deepen and broaden students' knowledge of their own expertise in relation to the society in learning about computers and technology in education.					
Contents of class					
Students will be offered some overviews of computers and education. Students will give some presentations on the following problems: (1) to make the teaching plan of their own research subjects for pupils or junior high school students, (2) to make a simulated class based on the plan, (3) to discuss the simulated class. At the end of term, students are required to submit an essay on computers and education.					
(on-demand) 1.Guidance, Lecture#1(Introduction to subject "Information".)					
(on-demand) 2.Lecture#2(Computer system for education. and Software as course material.)					
(on-demand) 3.Lecture#3(Cooperation with the period of integrated study.)					
(on-demand) 4.Lecture#4(Simulated class: plan and evaluation.)					
(on-demand) 5.Lecture#5(Keep an "Information" teacher. and Teaching plan.)					
(on-demand) 6.Lecture#6(Information sending and presentation.)					
(on-demand) 7.Lecture#7(Group work by collaboration and presentation.)					
(on-demand) 8.Lecture#8(Media literacy., Information ethics education. and Network.)					
(remote simultaneous interactive) 9.Presentations of Teaching Plans #1					
(remote simultaneous interactive) 10.Presentations of Teaching Plans #2					
(on-demand) 11.Lecture#9(Expression of information and multimedia. and Topics in information society.)					
(on-demand) 12.Lecture#10(Algorithm and programming. and Information retrieval and database.)					
(remote simultaneous interactive) 13.Simulated Classes #1					
(remote simultaneous interactive) 14.Simulated Classes #2					
(remote simultaneous interactive) 15.Simulated Classes #3					
(remote simultaneous interactive) 16.Presentations of Final Reports					
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 required to solve the problems mentioned above. To enhance a learning effect, students are encouraged to refer to course material. To prepare for and review the lecture for around 90 minutes each.					
Related subjects					
N/A					
Notes for textbook					
Students will be offered some overviews of "JOUHOUKA KYOUIKUHOU" (the following reference) using WWW.					
Reference1	Book title	JOUHOUKA KYOUIKUHOU (KAITEI SAN-HAN) *** in JAPANESE ***		ISBN	978-4-274- 21920-7
	Author	Yasushi Kuno, et al.	Publisher	OHM-SHA	Publish year 2016
Notes for reference					
N/A					

Goals to be achieved

At the end of the course, students will be able to deepen and broaden students' knowledge of their own expertise in relation to the society, and to represent them using computers and technology in education.

Evaluation of achievement

Weighting:

Reports 50%.

In class work 50%.

Grading scale:

90% and above S

80% - 89% A

70% - 79% B

60% - 69% C

Examination

授業を実施

Regular Class

Details of examination

N/A

Other information

N/A

Reference URL

<http://www.ita.cs.tut.ac.jp/~kawai/kpe/> (Some pages are written in Japanese.)

Office hours

Office hours; Wednesday 2nd period and Friday 2nd period in Room F1-206.

Relations to attainment objectives of learning and education

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

Key words

Informatics, Computer Literacy, Scientific Communication.

Informatics, Computer Literacy, Scientific Communication.

(D53030360)Advanced Statistical Machine Learning Theory[Advanced Statistical Machine Learning Theory]

Subject name[English]	Advanced Statistical Machine Learning Theory[Advanced Statistical Machine Learning Theory]				
Schedule number	D53030360	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Spring2 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]	渡辺 一帆 WATANABE Kazuho				
Numbering	CMP_DOC72425				
Objectives of class 機械学習手法はパターン認識・データマイニング等の基本技術として幅広く応用されている。 本講義では、統計的推測としての機械学習手法の基本原理や性質を理解することを目標とする。 The objective of this course is to learn the fundamental theory of statistical machine learning as statistical inference, which has wide applications such as pattern recognition and data mining.					
Contents of class (対面) 第1週:概論, 確率モデルの基礎 (オンデマンド)第2週:最尤推定, 推定量の性質 (対面) 第3週:判別モデル, 最適化法 (オンデマンド)第4週:正則化, モデル選択 (対面) 第5週:ベイズ学習, サンプリング法 (オンデマンド)第6週:潜在変数モデル, EM アルゴリズム (対面) 第7週:経験ベイズ法, 近似ベイズ学習 (オンデマンド)第8週:統計的学習理論 本学の新型コロナウイ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。 (face-to-face) 1. Introduction, Fundamentals of Probabilistic Models (on-demand) 2. Maximum Likelihood Method, Properties of Estimator (face-to-face) 3. Discriminative Model, Optimization Methods (on-demand) 4. Regularization Methods, Model Selection (face-to-face) 5. Bayesian Learning, Sampling Method (on-demand) 6. Latent Variable Model, EM Algorithm (face-to-face) 7. Empirical Bayes Method, Approximate Bayesian Learning (on-demand) 8. Statistical Learning Theory 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 各回の内容を参考書等で予習し(90分)、小演習やその類題を復習する(90分)。 It is desirable to prepare each class by reading reference books (90 min.) and review each class by solving assigned exercises (90 min.).					
Related subjects 特になし					

N/A

Notes for textbook
講義スライドを配布

Lecture slides are distributed.

Reference1	Book title	Information theory, inference, and learning algorithms			ISBN	978-0521642989
	Author	David J.C. MacKay	Publisher	Cambridge University Press	Publish year	2003
Reference2	Book title	Pattern recognition and machine learning			ISBN	978-0387310732
	Author	Christopher M. Bishop	Publisher	Springer	Publish year	2006
Reference3	Book title	Algebraic geometry and statistical learning theory			ISBN	978-0521864671
	Author	Sumio Watanabe	Publisher	Cambridge University Press	Publish year	2009

Notes for reference

特になし

N/A

Goals to be achieved

- 1) 代表的な機械学習手法についての基本的な知識と理解
 - 2) 基本的な確率モデルと学習法について学習アルゴリズムが導出できること
 - 3) 学習法の汎化性能について基礎的な理解を得ること
- 1) Fundamental knowledge and understanding of popular machine learning methods
 - 2) Ability to derive learning algorithms for fundamental probabilistic models and learning methods
 - 3) Fundamental understanding of generalization capabilities of learning methods

Evaluation of achievement

レポートにより評価する。

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: 達成目標をすべて達成しており、かつレポートの点(100点満点)が90点以上

A: 達成目標を80%達成しており、かつレポートの点(100点満点)が80点以上

B: 達成目標を60%達成しており、かつレポートの点(100点満点)が70点以上

C: 達成目標を40%達成しており、かつレポートの点(100点満点)が60点以上

Scores will be measured comprehensively by the points of the small exercises assigned in several classes:

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

S: Achieved all goals and obtained average points of the report, 90 or higher (out of 100 points).

A: Achieved 80 % of goals and obtained points of the report, 80 or higher (out of 100 points).

B: Achieved 60 % of goals and obtained points of the report, 70 or higher (out of 100 points).

C: Achieved 40 % of goals and obtained points of the report, 60 or higher (out of 100 points).

Examination

授業を実施
Regular Class

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(必要に応じ e-mail 等で日時を打ち合わせる)

as needed (contact via email etc. if needed)

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、

(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

機械学習, 統計的推測, 統計的学習理論

Machine Learning, Statistical Inference, Statistical Learning Theory

(D53030450)Advanced Computational Intelligence in Brain System[Advanced Computational Intelligence in Brain System]

Subject name[English]	Advanced Computational Intelligence in Brain System[Advanced Computational Intelligence in Brain System]				
Schedule number	D53030450	Subject area	Advanced Computer Science and Engineering	Required or elective	Elective
Time of starting a course	Spring1 term	Day of the week,period	Wed.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]	村越 一支 MURAKOSHI Kazushi				
Numbering	CMP_DOC73125				
Objectives of class This course provides opportunities to learn the followings: * Modeling and analysis on complex systems and learning systems, * System theoretic analysis on complex systems and learning systems, * Computer simulations and implications, and * Implementation of complex systems and learning systems. Recent topics on complex systems and learning systems will be also discussed in the course.					
Contents of class - Introduction on computational intelligent brain systems - Information Processing by computational intelligent brain systems - Computer simulation and information processing (face to face) 1st-3rd weeks. explanation (on-demand) 4th-7th weeks. tasks					
Self Preparation and Review Review each lecture (90 minutes) and prepare for the next class with reference to the textbook (90 minutes).					
Related subjects You must take the credits of "Computational Intelligence in Brain System" in master course in advance.					
Notes for textbook No textbook.					
Notes for reference N/A					
Goals to be achieved Understand and imolement modeling / analysys in complex dynamical systems					
Evaluation of achievement Class performance (50%) and term-end report (50%)					
Examination その他 Other					
Details of examination N/A					
Other information E-mail: mura[at]tut.jp (replace [at] with @) Room F-507, Ext. 6899					
Reference URL N/A					
Office hours After this class or post question or consultation to the google classroom.					
Relations to attainment objectives of learning and education (C) Practical and creative skills to utilize advanced knowledge in an integrated manner					

Have advanced knowledge about 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

N/A

(D54030030)Advanced Ecological Engineering[Advanced Ecological Engineering]

Subject name[English]	Advanced Ecological Engineering[Advanced Ecological Engineering]				
Schedule number	D54030030	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Thu.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]	大門 裕之, 中野 裕美, 東海林 孝幸 DAIMON Hiroyuki, NAKANO Hiromi, TOKAIRIN Takayuki				
Numbering	CHE_DOC74225				
Objectives of class					
The course provides for the opportunity to improve your level in the presentation skills through reading current research articles. The research area are Environmental Chemical Engineering, Environmental Biotechnology and Inorganic Chemistry.					
Contents of class					
1. Students have to select at least three articles in the field of one of professors. Three weeks/professor & one week					
2. Students prepare both reports and present slides.					
3. The key words will be given at the first class.					
Week1 (Face to face) : Environmental Problem and Science (Preparation) (Daimon)					
Week2 (Face to face): Environmental Problem and Science (Explanation) (Daimon)					
Week3 (Remote simultaneous interactive) : Environmental Problem and Science (Question) (Daimon)					
Week4 (Remote simultaneous interactive) : Environmental Problem and Science (Discussion I)(Daimon)					
Week5 (Face to face) : Environmental Problem and Science (Discussion II)(Daimon)					
Week6 (Face to face) :(Tokairin)					
Week7 (Remote simultaneous interactive) : (Tokairin)					
Week8 (Remote simultaneous interactive) : (Tokairin)					
Week9 (Remote simultaneous interactive) : (Tokairin)					
Week10 (Face to face)					
Week11 (Face to face)Technics of material processing base on the nature science (Nakano)					
Week12 (Remote simultaneous interactive)Technics of characterization using a transmission electron microscope (Nakano)					
Week13 (Remote simultaneous interactive)Discussions for papers of frontier researches I (Nakano)					
Week14 (Face to face)Discussions and evolutions for researches (Nakano)					
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					
毎回講義内容を復習するとともに、次週の内容についてテキスト等を参考に予習してくること。					
Review each lecture and prepare for the next class with reference to the textbook.					
Related subjects					
特になし Knowledge of environmental chemistry, chemical engineering and materials science is desirable.					
Notes for textbook					
特になし Papers(resume)will be distributed					
Notes for reference					

特になし
N/A
Goals to be achieved
特になし To improve presentation skills(writing of reports and preparing of slides).
Evaluation of achievement 30% Report, 70% Presentation(30-45 min) 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
特になし
N/A
Other information
特になし
N/A
Reference URL
特になし
N/A
Office hours Anytime, but reservation is desirable.
Relations to attainment objectives of learning and education
Key words environmental chemistry, chemical engineering, materials science, sustainable engineering

(D54030040)Advanced Biotechnology 1[Advanced Biotechnology 1]

Subject name[English]	Advanced Biotechnology 1[Advanced Biotechnology 1]				
Schedule number	D54030040	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Elective
Time of starting a course	Spring 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]	浴 俊彦, 田中 照通, 中鉢 淳 EKI Toshihiko, TANAKA Terumichi, NAKABACHI Atsushi				
Numbering	CHE_DOC73225				
Objectives of class					
This course will provide the students with the opportunity to study on advanced life sciences (e.g., genomics, molecular genetics, microbiology, and biotechnology).					
Contents of class					
In this course, the students will be expected to read several papers on the current progress in advanced life science (e.g., genomics, molecular genetics, microbiology, and biotechnology) to understand the frontier of these scientific fields. This course will be given by three instructors as described below (Eki, Tanaka, and Nakabachi).					
1st~5th week (on-demand): Genome and gene sciences (Dr. T. Eki)					
6th~10th week: (on-demand): Genetic and Protein engineering (Dr. T. Tanaka)					
11th~14th week (on-demand): Animal-microbe symbioses (Dr. A. Nakabachi)					
If there are any changes regarding 'Toyohashi University of Technology Activity Restrictions Level for Preventing the Spread of Corona virus', the course content and evaluation of achievement can be changed. (If there is any change about a class schedule, we will inform you on Google Classroom or KYOMU JOHO SYSTEM.)					
Self Preparation and Review					
To enhance a learning effect, students are encouraged to review the lecture for around 90 minutes each.					
Related subjects					
The knowledge of basic molecular biology and biochemistry is absolutely essential.					
Notes for textbook					
Papers and references will be given by each instructor in the course.					
Notes for reference					
N/A					
Goals to be achieved					
To understand the current status in advanced life sciences including genomics, molecular genetics, microbiology and biotechnology by summarizing, and making presentations and/or reports.					
Evaluation of achievement					
Grades for the course will be based on the average of the subject scores (by Eki, Tanaka, and Nakabachi).					
[Evaluation basis]					
Students who attend all classes will be evaluated as follows:					
S: Achieved all goals and obtained total points of exam and reports, 90 or higher (out of 100 points).					
A: Achieved all goals and obtained total points of exam and reports, 80 or higher (out of 100 points).					
B: Achieved 70% of goals and obtained total points of exam and reports, 70 or higher (out of 100 points).					
C: Achieved 60% of goals and obtained total points of exam and 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					
N/A					
Other information					
Dr. Toshihiko Eki: Room: G-505, Phone: 6907, E-mail: eki@chem.tut.ac.jp					
Dr. Terumichi Tanaka: Room: G-506. Phone: 6920, E-mail: terumichi-tanaka@tut.jp					
Dr. Atsushi Nakabachi: Room: G-502, Phone: 6901, E-mail: nakabachi@eiiris.tut.ac.jp					
Reference URL					

N/A

Office hours

Please make an appointment.

Relations to attainment objectives of learning and education

Key words

(D54030060)Advanced Molecular Function Chemistry 1[Advanced Molecular Function Chemistry 1]

Subject name[English]	Advanced Molecular Function Chemistry 1[Advanced Molecular Function Chemistry 1]				
Schedule number	D54030060	Subject area	Advanced Applied Chemistry and Life Science	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Tue.1~1	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]	柴富 一孝, 原口 直樹 SHIBATOMI Kazutaka, HARAGUCHI Naoki				
Numbering	CHE_DOC72225				
Objectives of class					
This course focuses on state-of-the-art technology of functional polymers and synthesis as for bioactive organic compounds. Synthesis and various applications of the functional polymers and bioactive organic compounds will be discussed.					
Contents of class					
(1) General aspects of functional polymers (Haraguchi) (2) Precise molecular design of functional polymers(Haraguchi) (3) Preparation of highly functionalized polymers(Haraguchi) (4) Reactive polymer synthesis(Haraguchi) (5) Optically active polymers(Haraguchi) (6) Asymmetric synthesis and polymerization(Haraguchi) (7) Synthesis and structure-function relationship of biobased and biodegradable polymers(Haraguchi) (8) Bioactive natural products (Shibatomi) (9) Total synthesis of natural products (Shibatomi) (10) Transition metal complexes and 18 electron rule (Shibatomi) (11) Chiral catalysts and their applications (Shibatomi) (12) Advanced Lewis acid catalysis. (Shibatomi) (13) Advanced organocatalysis. (Shibatomi) (14) Asymmetric synthesis of halogenated compounds and their synthetic applications. (Shibatomi) (15) Advanced organofluorine chemistry (Shibatomi)					
Self Preparation and Review					
Review each lecture and prepare for the next class with reference to the textbook. (90 min + 90 min)					
Related subjects					
D34030060 Advanced Molecular Function Chemistry 1 M44630100 Special Topics in Applied Organic Chemistry M24630460 応用有機化学特論					
Notes for textbook					
No textbooks are required.					
Notes for reference					
N/A					
Goals to be achieved					
To understand the latest trend of the research on functional polymers. To understand the latest trend of the research on total synthesis of natural products and their synthetic methods.					
Evaluation of achievement					
Presentation (50%) and discussion (50%) Evaluation basis] Students who attend all classes will be evaluated as follows: S: Achieved all goals and obtained total points of exam and reports, 90 or higher (out of 100 points). A: Achieved 80 % goals and obtained total points of exam and reports, 80 or higher (out of 100 points). B: Achieved 70 % of goals and obtained total points of exam and reports, 70 or higher (out of 100 points). C: Achieved 60 % of goals and 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					
N/A					
Other information					

N. Haraguchi: haraguchi@chem.tut.ac.jp (office: B-403, ex:6812)
K. Shibatomi: shiba@chem.tut.ac.jp (room: B-507)

Reference URL

<http://www.siorgchem.ens.tut.ac.jp/index.html>
<http://chem.tut.ac.jp/chiral/>

Office hours

anytime by e-mail.

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、

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

Key words

functional polymer, asymmetric catalyst, transition metal, organocatalyst, Lewis acid, fluorine

(D55030030)Advanced Building Environmental Engineering and Building Services[Advanced Building Environmental Engineering and Building Services]

Subject name[English]	Advanced Building Environmental Engineering and Building Services[Advanced Building Environmental Engineering and Building Services]				
Schedule number	D55030030	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Mon.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]	島崎 康弘 SHIMAZAKI Yasuhiro				
Numbering	ARC_DOC74125				
Objectives of class					
The goal of this course is to help professionals update related to the recent research and development on life cycle assessment (LCA) for buildings, environmental symbiotic technologies, climatic building design and urban energy management.					
Contents of class					
The course consists of the following topics.					
1. (face to face) Buildings and its Impact on the Global Environment					
2. (face to face) Impact Assessment indices for Buildings					
3. (face to face) Life Cycle Inventory for Buildings					
4. (face to face)Environmental Symbiotic Technologies (1)					
5. (face to face) Environmental Symbiotic Technologies (2)					
6. (face to face) Ecological Building Design (1)					
6. (face to face) Ecological Building Design (2)					
8. (face to face) Climatic Building Design (1)					
9. (face to face) Climatic Building Design (2)					
10. (face to face)Sustainable Building Design (1)					
11. (face to face) Sustainable Building Design (2)					
12. (face to face) Energy and Buildings (1)					
13. (face to face) Energy and Buildings (2)					
14. (face to face) Compact city –urban energy management–					
15. (face to face) Compact city –urban energy management– (2)					
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					
The course materials such book chapter or academic paper related to this course will be appeared or provided at the first class or orientation.					
In order to enhance a learning effect, prepare for and review the lecture for around 90 minutes each.					
Related subjects					
Building science: Indoor Air Quality and Ventilation, Building and Urban Thermal Environment					
Notes for textbook					
The related handouts will be distributed.					
Reference1	Book title	Architecture for a Sustainable Future –All about the Holistic Approach in Japan–		ISBN	
	Author	Architectural Institute of Japan	Publisher	Institute for Building Environment and Energy Conservation	Publish year 2002
Notes for reference					
N/A					
Goals to be achieved					
Achievement level of this course is to understand the background of building's impact on the global environment, the practical strategies for sustainable building design, urban energy management and so on.					

Evaluation of achievement Reports related to this subject are reviewed to evaluate the achievement level.
Examination レポートで実施 By Report
Details of examination N/A
Other information N/A
Reference URL N/A
Office hours Anytime upon request. Please contact by e-mail in advance.
Relations to attainment objectives of learning and education
Key words climatic building design, sustainable building design, building energy management, energy saving

(D55030090)Advanced Transportation Systems and Economics[Advanced Transportation Systems and Economics]

Subject name[English]	Advanced Transportation Systems and Economics[Advanced Transportation Systems and Economics]				
Schedule number	D55030090	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Tue.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]	洗澤 博幸, 杉木 直, 松尾 幸二郎 SHIBUSAWA Hiroyuki, SUGIKI Nao, MATSUO Kojiro				
Numbering	ARC_DOC73325				
Objectives of class					
To obtain the advanced knowledge of theories and methods for policies and planning for cities, regions,transportation, and the environment. To obtain the advanced knowledge of theories and methods for policies and planning for cities, regions,transportation and the environment.					
Contents of class					
By using books, reports and papers on cities, regions, infrastructure and the environment, students learn the advanced transportation systems and transportation economics. Discussion between the lecturer and students shall be performed in the lecture time. 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 by e-mail or on Google Classroom or KYOMU JOHO SYSTEM.					
Self Preparation and Review					
Review each lecture and prepare for the next class with reference to the textbook.					
Related subjects					
Transportation systems Spatial economic system analysis					
Notes for textbook					
Textbooks and scientific papers will be announced at the start of the class.					
Notes for reference					
N/A					
Goals to be achieved					
1.To understand the necessity and significance of policy and planning for cities, regions, infrastructure and the environment. 2.To understand the concept of policy and planning for the above mentioned fields. 3.To understand methodologies in the above mentioned fields.					
Evaluation of achievement					
Home work assignments shall be required. Final reports or examination shall be conducted. S: Total points obtained from exams and/or reports, etc., 90 or higher (out of 100 points). A: Total points obtained from exams and/or reports, etc., 80 or higher (out of 100 points). B: Total points obtained from exams and/or reports, etc., 70 or higher (out of 100 points).					

C: Total points obtained from exams and/or reports, etc., 60 or higher (out of 100 points).

Examination

レポートで実施

By Report

Details of examination

N/A

Other information

Shibusawa: room(D-709), hiro-shibu@tut.jp, phone: 0532-44-6955

Sugiki: room(D-705), sugiki@ace.tut.ac.jp, phone: 0532-44-6833

Matsuo: room(D-715), k-matsuo@ace.tut.ac.jp, phone: 0532-44-6864

Reference URL

Shibusawa: <http://www.pm.ace.tut.ac.jp>

Sugiki, Matsuo: <https://sites.google.com/tr.ace.tut.ac.jp/home/en>

Office hours

Hiroyuki Shibusawa: At any time. Please contact Shibusawa by e-mail in advance.

Nao Sugiki: At any time. Please contact Sugiki by e-mail in advance.

Kojiro Matsuo: At any time. Please contact Matsuo by e-mail in advance.

Relations to attainment objectives of learning and education

Key words

planning process, social & economic evaluation method, forecasting models, 実務経験

planning process, social & economic evaluation method, forecasting models

(D55030130)Advanced Western Culture[Advanced Western Culture]

Subject name[English]	Advanced Western Culture[Advanced Western Culture]				
Schedule number	D55030130	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring 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			Begging grade	D1
Charge teacher name[Roman alphabet mark]	相京 邦宏 AIKYO Kunihiro				
Numbering	ARC_DOC74325				
Objectives of class					
Research on a history of scientific ideas in the ancient world. Research on a history of scientific ideas in the ancient world.					
Contents of class					
Lecture on a view of nature and science in the ancient world. Modern science and ancient 'science'. What are similarities or differences between the two?					
Program of lecture					
1. Orientation (outline of the lecture) (face to face)					
2. Purpose of the Series (face to face)					
3. Science in Antiquity? (face to face)					
4. Modern Science 1 (face to face)					
5. Modern Science 2 (face to face)					
6. History and Philosophy (face to face)					
7. Building Histories 1 (face to face)					
8. Building Histories 2 (face to face)					
9. Building Histories 3 (face to face)					
10. Intellectual Paternities 1 (face to face)					
11. Intellectual Paternities 2 (face to face)					
12. Selective Survival of Texts (face to face)					
13. Resources for History 1 (face to face)					
14. Resources for History 2 (face to face)					
15. Summery of the lecture (on-demand)					
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.					
Lecture on a view of nature and science in the ancient world. Modern science and ancient 'science'. What are similarities or differences between the two?					
Program of lecture					
1. Orientation (outline of the lecture) (face to face)					
2. Purpose of the Series (face to face)					
3. Science in Antiquity? (face to face)					
4. Modern Science 1 (face to face)					
5. Modern Science 2 (face to face)					
6. History and Philosophy (face to face)					
7. Building Histories 1 (face to face)					
8. Building Histories 2 (face to face)					
9. Building Histories 3 (face to face)					
10. Intellectual Paternities 1 (face to face)					
11. Intellectual Paternities 2 (face to face)					

12. Selective Survival of Texts (face to face)
13. Resources for History 1 (face to face)
14. Resources for History 2 (face to face)
15. Summary of the lecture (on-demand)

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

Preparation & review of text
Preparation & review of text

Related subjects

「特になし」
N/A

Notes for textbook

特になし
N/A

Notes for reference

Roger French, Ancient Natural History. Routledge, 1994.
Roger French, Ancient Natural History. Routledge, 1994.

Goals to be achieved

- (1)A correct perception of a history of science.
 - (2)A comprehensive grasp of the origin of scientific ideas in Western Europe.
 - (3)Understanding of basic terms on a history of science.
 - (4)A correct understanding of a relation between modern science and pre-modern science.
 - (5)A total appreciation of a transition of scientific ideas.
 - (6)A correct understanding of literature on a history of science.
-
- (1)A correct perception of a history of science.
 - (2)A comprehensive grasp of the origin of scientific ideas in Western Europe.
 - (3)Understanding of basic terms on a history of science.
 - (4)A correct understanding of a relation between modern science and pre-modern science.
 - (5)A total appreciation of a transition of scientific ideas.
 - (6)A correct understanding of literature on a history of science.

Evaluation of achievement

Holding the end-of-term exams.
Holding the end-of-term exams.

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

pm. 1-4(Wednesday)

pm. 1-4(Wednesday)

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。

(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究し、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。

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.

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

ancient, science, history

ancient, science, history

(D55030150)Advanced Environmental Control in Biology[Advanced Environmental Control in Biology]

Subject name[English]	Advanced Environmental Control in Biology[Advanced Environmental Control in Biology]				
Schedule number	D55030150	Subject area	Advanced Architecture and Civil Engineering	Required or elective	Elective
Time of starting a course	Spring term	Day of the week,period	Tue.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]	東海林 孝幸 TOKAIRIN Takayuki				
Numbering	ARC_DOC74025				
Objectives of class					
太陽光型植物工場や人工光型植物工場などの環境制御型農業生産施設における環境制御と植物環境応答について高度な知識を身に付ける。					
Advanced Environmental Control in Biology [Advanced Environmental Control in Biology]					
Contents of class					
(オンデマンドまたは対面)第1回:太陽光植物工場と人工光植物工場					
(オンデマンドまたは対面)第2回:クロロフィル蛍光と光合成の基礎,クロロフィル蛍光計測Ⅰ-インダクション法-					
(オンデマンドまたは対面)第3回:クロロフィル蛍光計測Ⅱ-飽和パルス法,PAM,画像計測法-					
(オンデマンドまたは対面)第4回:匂い成分計測技術Ⅰ-ガスクロマトグラフィの基礎-					
(オンデマンドまたは対面)第5回:匂い成分計測技術Ⅱ-植物診断技術としての匂い成分計測-					
(オンデマンドまたは対面)第6回:光合成と蒸散のガス収支の基礎					
(オンデマンドまたは対面)第7回:開放型光合成蒸散測定の数値計算					
(オンデマンドまたは対面)第8回:環境制御の概論					
(オンデマンドまたは対面)第9回:太陽光植物工場の環境制御					
(オンデマンドまたは対面)第10回:人工光植物工場の環境制御					
(オンデマンドまたは対面)第11回:大気環境学1 大気の流れ					
(オンデマンドまたは対面)第12回:大気環境学2 大気の流れの数式化					
(オンデマンドまたは対面)第13回:大気環境学3 シミュレーション-1					
(オンデマンドまたは対面)第14回:大気環境学4 シミュレーション-2・総括					
(on-demand or face to face)1. Intelligent greenhouse and plant factory of artificial lighting					
(on-demand or face to face)2. Chlorophyll fluorescence measurement for plant diagnosis-1: Induction method					
(on-demand or face to face)3. Chlorophyll fluorescence measurement for plant diagnosis-2: Saturation pulse method, PAM and imaging					
(on-demand or face to face)4. Volatile organic compound measurement-1: Gas chromatography -1: Basics					
(on-demand or face to face)5. Volatile organic compound measurement-1: Gas chromatography -1: For plant diagnosis					
(on-demand or face to face)6. Photosynthesis and transpiration as gas exchanges between atmosphere and plant					
(on-demand or face to face)7. Open chamber method for photosynthesis measurement					
(on-demand or face to face)8. Outline of environmental control in biology					
(on-demand or face to face)9. Environmental control in an intelligent greenhouse					
(on-demand or face to face)10. Environmental control in plant factory of artificial lighting					
(on-demand or face to face)11. Atmospheric environment-1: Dynamics of air in atmosphere					
(on-demand or face to face)12. Atmospheric environment-2: Formulation of air dynamics					
(on-demand or face to face)13. Atmospheric environment-3: Simulation/modeling of atmosphere-1					
(on-demand or face to face)14. Atmospheric environment-4: Simulation/modeling of atmosphere-2・Discussion for the prospect					
Self Preparation and Review					
担当教員が執筆した研究論文を参考に学習を行う。					
Referring the research papers published by the teachers in charge.					
Related subjects					
特になし					
N/A					
Notes for textbook					

特になし N/A					
Reference1	Book title	Plants and microclimate : a quantitative approach to environmental plant physiology		ISBN	0521425247
	Author	Hamlyn G. Jones	Publisher	Cambridge University Press	Publish year
Notes for reference 特になし N/A					
Goals to be achieved 1. 環境制御型農業生産に求められる環境制御技術を理解すること 2. 植物環境応答の高度な知識と理解 3. 大気環境の高度な知識と理解 1. Advanced knowledge and understanding of environmental control in horticulture 2. Advanced knowledge and understanding of plant environmental responses and plant diagnosis 3. Advanced knowledge and understanding of Atmospheric environment					
Evaluation of achievement レポート 50% 授業中の口頭試問 50% 左記の割合で、総合的に評価する。 50% on reports, 50% on oral examination in the lectures.					
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 火曜日 11～13時 Tuesday 11am-1pm					
Relations to attainment objectives of learning and education					
Key words 環境制御, 大気, 大気環境, モデル, シミュレーション, 植物, 作物, 農業, 施設園芸, 環境応答, 植物診断 Environmental control, atmosphere, atmospheric environment, modeling, simulation, plant, crop, agriculture, horticulture, environmental response, plant diagnosis,					