科目コード (Code)	科目名 (Course title)	Course title (English)
10H802	有機設計学	Organic System Design
10H804	有機合成化学	Synthetic Organic Chemistry
10H808	物理有機化学	Physical Organic Chemistry
10H815	生体認識化学	Biorecognics
10H816	生物工学	Microbiology and Biotechnology
10H818	先端有機化学	Advanced Organic Chemistry
10H836	先端生物化学	Advanced Biological Chemistry
10P836	先端生物化学続論	Advanced Biological Chemistry 2 Continued
10H042	有機金属化学２	Organotransition Metal Chemistry 2
10D837	Supramolecular Chemistry	Supramolecular Chemistry
10D839	合成・生物化学特論Ａ	Synthetic Chemistry and Biological Chemistry, Adv,A
10D841	合成・生物化学特論Ｃ	Synthetic Chemistry and Biological Chemistry, Adv,C
10D843	合成・生物化学特論Ｅ	Synthetic Chemistry and Biological Chemistry, Adv,E
10D828	合成・生物化学特別実験及演習	Special Experiments and Exercises Synthetic Chemistry and Biological Chemistry
10i061	先端マテリアルサイエンス通論（4回コース）	Introduction to Advanced Material Science and Technology (4 times course)
10i062	先端マテリアルサイエンス通論（8回コース）	Introduction to Advanced Material Science and Technology (8 times course)
10i063	先端マテリアルサイエンス通論（12回コース）	Introduction to Advanced Material Science and Technology (12 times course)
10i055	現代科学技術特論（4回コース）	Advanced Modern Science and Technology (4 times course)
10i056	現代科学技術特論（8回コース）	Advanced Modern Science and Technology (8 times course)
10i060	現代科学技術特論（12回コース）	Advanced Modern Science and Technology (12 times course)
10D043	先端科学機器分析及び実習Ⅰ	Instrumental Analysis,Adv.I
10D046	先端科学機器分析及び実習ⅠⅠ	Instrumental Analysis,Adv.II
10i051	現代科学技術の巨人セミナー「知のひらめき」（6Hコース）	Frontiers in Modern Scinece and Technology (6H course)
10i052	現代科学技術の巨人セミナー「知のひらめき」（12Hコース）	Frontiers in Modern Scinece and Technology (12H course)
88G101	研究倫理・研究公正（理工系）	Research Ethics and Integrity(Scienceand Technology)
88G103	研究倫理・研究公正（生命系）	Research Ethics and Integrity(LifeScience)
10G201	固体衝撃論	Impact Mechanics of Solids
88G301	大学院生のための英語プレゼンテーション	Presentation for Graduate Students
10i045	実践的科学英語演習Ⅰ	Exercise in Practical Scientific English I
10i041	科学技術者のためのプレゼンテーション演習	Professional Scientific Presentation Exercises
10i042	工学と経済（上級）	Advanced Engineering and Economy
10i010	工学研究科国際インターンシップ１	International Internship in Engineering 1
10i011	工学研究科国際インターンシップ２	International Internship in Engineering 2
10i049	エンジニアリングプロジェクトマネジメント	Project Management in Engineering
10i059	エンジニアリングプロジェクトマネジメント演習	Exercise on Project Management in Engineering
10S807	合成・生物化学特別セミナー１	Special Seminar 1 in Synthetic Chemistry and Biological Chemistry
10S808	合成・生物化学特別セミナー２	Special Seminar 2 in Synthetic Chemistry and Biological Chemistry
10S809	合成・生物化学特別セミナー３	Special Seminar 3 in Synthetic Chemistry and Biological Chemistry

Numbering code	G-ENG16 6H802 LJ60		
Course title <English>	有機設計学 Organic System Design	Affiliated department, Job title,Name	Graduate School of Engineering Professor,SUGINOME MICHINORI Graduate School of Engineering Associate Professor,OOMURA TOSHIMICHI

Target year		Number of credits	1.5	Course offered year/period	2019/First semester

Day/period	Tue.2	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

有機触媒反応の設計と触媒反応の合成化学的な利用を理解するため，触媒的不斉反応を取り上げ，その概説とともに有機ホウ素化合物を用いた不斉反応を例として挙げながら解説する。

[Course Goals]

キラル触媒を用いた不斉触媒反応の原理と，有機合成化学への応用における意義を理解する。

[Course Schedule and Contents]

不斉合成の概観・基礎(1回)
不斉合成の基本的事項（光学分割法、エナンチオ選択的反応）について概説する。

不斉合成の各論：遷移金属触媒反応(4回)
キラル配位子と有機金属化合物を用いる触媒的不斉反応について詳述する。(1)キラル遷移金属触媒を用いた不斉水添及び関連反応，(2)ホウ素を含んだσ結合の炭素ー炭素多重結合への不斉付加反応，(3)クロスカップリングによる不斉炭素ー炭素結合形成，(4)不斉共役付加反応，を取り上げる。

不斉合成の各論：有機触媒反応(2回)
キラル有機触媒を用いる触媒的不斉反応について詳述する。(1)不斉求核触媒，エナミン形成触媒，およびイミニウム形成触媒，(2)キラル相間移動触媒およびキラルブレンステッド酸触媒，を取り上げる。

不斉合成の各論：不斉触媒反応の新しいコンセプト(2回)
不斉触媒反応に関する最近のトピックスを解説する。(1)不斉増幅を伴う不斉触媒反応，動的キラリティ，(2)エナンチオ収束反応，ジアステレオマーの不斉自在合成，を取り上げる。

不斉合成の各論：不斉触媒反応開発の最前線(1回)
不斉触媒反応の開発研究における最新の成果を解説する。

全体のまとめ(1回)
不斉合成の概観および展望を総括する。

[Class requirement]

None

Continue to 有機設計学(2)↓↓↓

有機設計学(2)

[Method, Point of view, and Attainment levels of Evaluation]

成績の判定は試験の成績に平常点を加味して行う。

[Textbook]

Not used

[Reference books, etc.]

（Reference books）
『ウォーレン有機化学（下）』（東京化学同人）
Clayden, Greeves, and Warren 『Organic Chemistry, Second Edition』（OXFORD）
E. L. Eliel, S. H. Wilen 『Stereochemistry of Organic Compounds』（Wiley）
A. Koskinen 『Asymmetric Synthesis of Natural Products』（Wiley）
I. Ojima Ed. 『Catalytic Asymmetric Synthesis』（Wiley）
R. Noyori 『Asymmetric Catalysis in Organic Synthesis』（Wiley）
野依良治他 『大学院講義有機化学』（東京化学同人）

[Regarding studies out of class (preparation and review)]

必要に応じて指示する

（Others (office hour, etc.)）

隔年開講科目。

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG16 5H804 LJ61		
Course title <English>	有機合成化学 Synthetic Organic Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,NAGAKI AIICHIROU

Target year		Number of credits	1.5	Course offered year/period	2019/Second semester

Day/period	Mon.2	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

受講生の発表とそれに対する解説を通じて、有機合成反応の高度制御法に重点をおいて、有機合成法の最新の進展を系統的に整理するとともに、その将来の展望を論ずる。

[Course Goals]

有機合成反応の高度制御のための各種方法論の特長や適用範囲を理解し、実際の有機合成に活かせる力を身につける。

[Course Schedule and Contents]

導入(1回)
有機合成化学の現状および講義の進め方について解説する。

酸化反応(3回)
PCC酸化、Swern酸化、オゾン酸化、Wacker酸化、香月－Sharpless不斉エポキシ化など代表的な酸化反応についてその基本的原理を解説するとともに、いくつかの合成への応用例を紹介する

還元反応(2回)
接触還元、Birch還元、ヒドリド還元、Wolf-Kishner還元など代表的な還元反応についてその基本的原理を解説するとともに、いくつかの合成への応用例を紹介する。

炭素－炭素結合形成反応(3回)
有機リチウム反応やGrignard反応、Wittig反応、オレフィンメタセシス、Dields-Alder反応、1,3-双極子付加、Friedel-Crafts反応など代表的な炭素－炭素結合形成反応についてその基本的原理を解説するとともに、いくつかの合成への応用例を紹介する。

新手法(2回)
有機触媒、フロー化学、コンビナトリアル化学など有機合成の最新の手法について、その基本原理を解説するとともに、いくつかの応用例を紹介する。

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

発表と発表資料をもとに総合的に評価する。

[Textbook]

特になし

Continue to 有機合成化学(2)↓↓↓

有機合成化学(2)

[Reference books, etc.]

（Reference books）
有機合成化学協会編『トップドラッグから学ぶ創薬化学』（東京化学同人2012）

[Regarding studies out of class (preparation and review)]

必要に応じて指示する

（Others (office hour, etc.)）

隔年開講科目。

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	物理有機化学 Physical Organic Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,MATSUDA KENJI

Target year		Number of credits	1.5	Course offered year/period	2019/Second semester

Day/period	Thu.2	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

Properties of organic compounds, such as electric conductivity, magnetism, photophysical properties, are discussed in terms of molecular structure and electronic structure.

[Course Goals]

The goal of this course is to understand principles of photochemistry.

[Course Schedule and Contents]

Photochemical Reaction(1)
Photochemistry, Photophysics, einstein (unit), Jablonski diagram, Excitation, Internal conversion, Intersystem crossing, Fluorescence, Phosphorescence, Photochemical reaction

Excited States in Molecular Orbital Theory(2)
Born-Oppenheimer approximation, Flanck-Condon principle, Singlet, Triplet, Energy gap, n-pi*, pi-pi*, Potential energy surface, Conical intersection, Solvatochromism

Electronic Transition(2)
Transition probability, Fermi's golden rule, Transition moment, Oscillator strength, Polarized light, Stimulated emission, Einstein coefficient, Beer-Lambert law, Selection rule, Spin-orbit coupling

Radiative Transition(2)
Fluorescence, Phosphorescence, Fluorescence excitation spectrum, Mirror relationship, Vibrational structure, Fluorescence quantum yield, Emission rate constant

Behavior of the Excited Molecule(2)
Energy Transfer, Quenching, Trivial, Foerster, Dexter, FRET, Stern-Volmer plot, Excimer, Exciplex, Triplet sensitization

Phororeaction, Photoisomerization(2)
Quantum yield, Photochromism, Conversion in photoisomerization

[Class requirement]

None

Continue to 物理有機化学(2)↓↓↓

物理有機化学(2)

[Method, Point of view, and Attainment levels of Evaluation]

Report

[Textbook]

Not used

[Reference books, etc.]

（Reference books）

Introduced during class

[Regarding studies out of class (preparation and review)]

The basic knowledge of quantum mechanics is prerequisite for this class, so we recommend to review it before the class.

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG16 5H815 LJ29		
Course title <English>	生体認識化学 Biorecognics	Affiliated department, Job title,Name	Graduate School of Engineering Professor,UMEDA MASATO Graduate School of Engineering Associate Professor,HARA YUUJI

Target year		Number of credits	1.5	Course offered year/period	2019/First semester

Day/period	Thu.2	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

タンパク質や糖鎖を介する細胞内での分子認識、および感覚系（五感）の分子機構と疾患との関わりについて、「糖鎖生物学と細胞生物学」の基礎から最先端の研究について解説する。

[Course Goals]

生命活動における分子認識とその生物学的な意味を理解する。

[Course Schedule and Contents]

生物学的認識における糖鎖（１回）
なぜ糖鎖なのか、糖鎖の基本構造と機能

糖鎖の認識と感染症（１回）
糖鎖生物学の先駆者・血液型と糖鎖・糖転移酵素

糖脂質（１回）
スフィンゴ糖脂質・細胞間認識・がん

タンパク質の糖鎖修飾（１回）
糖鎖の生合成・糖鎖とタンパク質品質管理・糖鎖修飾と細胞内情報伝達

糖鎖結合タンパク質（１回）
グリコサミノグリカン結合タンパク質・各種レクチンの糖鎖認識機構と生物機能

感覚系の化学１（基礎）（１回）
感覚系（五感）に関わる研究手法等の基礎的な概説

感覚系の化学２（味覚）（１回）
味覚受容に関わる分子機構

感覚系の化学３（嗅覚）（１回）
嗅覚受容に関わる分子機構

感覚系の化学４（触覚・聴覚）（１回）
触覚・聴覚感知に関わる「機械受容」機構

感覚系の化学５（視覚）（１回）
光受容に関わる分子機構

Continue to 生体認識化学(2)↓↓↓

生体認識化学(2)

感覚系の化学６（総論）（１回）
感覚系に関わる疾患発症等のトピックス

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

出席点およびレポートの採点により総合的に評価する。

[Textbook]

Not used

[Reference books, etc.]

（Reference books）
講義で配布する資料を使用する

[Regarding studies out of class (preparation and review)]

未入力

（Others (office hour, etc.)）

隔年開講科目。

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	生物工学 Microbiology and Biotechnology	Affiliated department, Job title,Name	Graduate School of Engineering Professor,ATOMI HARUYUKI Graduate School of Engineering Senior Lecturer,KANAI TAMOTSU

Target year		Number of credits	1.5	Course offered year/period	2019/Second semester

Day/period	Wed.2	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

This lecture will introduce the various forms of life that are present on our planet as well as the mechanisms involved in sustaining their life. Commonly used tools in the fields of biochemistry, molecular biology and genetics will also be discussed. In addition, methods to utilize cells and their enzymes in biotechnology will be introduced. Lectures will be given in English, with the aim to improve communication/discussion skills.

[Course Goals]

Basic knowledge on the various forms of life that are present on our planet as well as the mechanisms involved in sustaining their life. An understanding of the commonly used tools in the fields of biochemistry, molecular biology and genetics as well as methods to utilize cells and their enzymes in biotechnology. Lectures will be given in English, with the aim to improve communication/discussion skills.

[Course Schedule and Contents]

Introduction 1 Diversity of life, classification of organisms, structure and function of fundamental biomolecules.
Basic mechanisms to sustain life 3 Strategies to conserve energy, biosynthesis, cell division, cell differentiation.
Strategies to adapt to environmental conditions 2 Effect of environmental conditions on cells and biomolecules, thermophiles, acidophiles and their enzymes.
Protein engineering 2 Methods to study enzymes and enzyme reactions, methods to enhance their performance.
Cell engineering 2 Methods utilized in metabolic engineering, cell surface engineering, synthetic biology.
Topic discussion 1 Particular topics will be chosen for discussion

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Grading will be based on presentations (60%) and attendance (40%).

[Textbook]

[Reference books, etc.]

（Reference books）

Continue to 生物工学(2)↓↓↓

生物工学(2)

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	先端有機化学 Advanced Organic Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,OOE KOUICHI Graduate School of Engineering Associate Professor,MIURA TOMOYA Graduate School of Engineering Associate Professor,NAGAKI AIICHIROU Institute for Chemical Research Associate Professor,TAKAYA HIKARU Graduate School of Engineering Associate Professor,KIMURA YUU

Target year		Number of credits	1.5	Course offered year/period	2019/First semester
Day/period	Tue.1	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

Chemoselectivity,2times,Introduction and chemoselectivity
Regioselectivity,2times,Controlled Aldol Reactions
Stereoselectivity,2times,Stereoselective Aldol Rections
Strategies ,2times,Alternative Strategies for Enone Synthesis
Choosing a Strategy,2times,The Synthesis of Cyclopentenones
Summary ,2times,Summary and outlook

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	先端生物化学 Advanced Biological Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,ATOMI HARUYUKI Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering Professor,UMEDA MASATO Graduate School of Engineering Senior Lecturer,KANAI TAMOTSU Graduate School of Engineering Associate Professor,HARA YUUJI Graduate School of Engineering Professor,HAMACHI ITARU Graduate School of Engineering Associate Professor,KIYONAKA SHIGEKI Graduate School of Engineering Associate Professor,MASAYUKI MORI

Target year		Number of credits	3	Course offered year/period	2019/First semester
Day/period	Mon.2,Fri.2	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,4times,
,4times,
,3times,
,4times,
,2times,
,2times,
,3times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

Continue to 先端生物化学(2)↓↓↓

先端生物化学(2)

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	先端生物化学続論 Advanced Biological Chemistry 2 Continued	Affiliated department, Job title,Name	Graduate School of Engineering Professor,ATOMI HARUYUKI Graduate School of Engineering Professor,MORI YASUO Graduate School of Engineering Professor,UMEDA MASATO Graduate School of Engineering Senior Lecturer,KANAI TAMOTSU Graduate School of Engineering Associate Professor,HARA YUUJI Graduate School of Engineering Professor,HAMACHI ITARU Graduate School of Engineering Associate Professor,KIYONAKA SHIGEKI Graduate School of Engineering Associate Professor,MASAYUKI MORI

Target year		Number of credits	1	Course offered year/period	2019/Intensive, First semester
Day/period	Intensive	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,3times,
,3times,
,2times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Continue to 先端生物化学続論(2)↓↓↓

先端生物化学続論(2)

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG13 6H042 LJ60　G-ENG12 6H042 LJ60　G-ENG15 6H042 LJ60

Course title <English>	有機金属化学２ Organotransition Metal Chemistry 2	Affiliated department, Job title,Name	Graduate School of Engineering Professor,NAKAO YOSHIAKI Graduate School of Engineering Professor,MURAKAMI MASAHIRO Graduate School of Engineering Professor,KONDOU TERUYUKI Graduate School of Engineering Professor,OOUCHI MAKOTO Graduate School of Engineering Associate Professor,MIKI KOUJI Graduate School of Engineering Associate Professor,KURAHASHI TAKUYA Graduate School of Engineering Associate Professor,FUJIHARA TETSUAKI

Target year		Number of credits	1.5	Course offered year/period	2019/First semester

Day/period	Fri.1	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

遷移金属錯体の合成法、構造的特徴、および重要な素反応と、それらの反応機構について解説する。また、隔年開講の「有機金属化学１」と連続的に講義を進め、遷移金属錯体を用いる触媒反応の有機合成化学、有機工業プロセスへの応用について解説する。

[Course Goals]

遷移金属錯体の化学についての基礎知識を習得する。また、それぞれの遷移金属錯体に特徴的な触媒反応の有機合成化学、有機工業プロセスへの応用について理解する。

[Course Schedule and Contents]

遷移金属錯体 I～III(3回)
① 遷移金属錯体の構造（形式酸化数、１８電子則、配位子の種類、ハプト数など），② 遷移金属錯体の反応（配位子置換反応、酸化的付加、還元的脱離、トランスメタル化など）
③ 遷移金属錯体の反応（挿入、脱離、配位子に対する求核剤の反応、酸化的環化など）

不飽和結合の反応 I～III(3回)
① ヒドロシアノ化、ヒドロアミノ化、ヒドロメタル化、カルボメタル化反応など。
② アルキン多量化、Pauson-Khand 反応、骨格異性化など
③ アルキンやアルケンの求電子的活性化を経る反応、カルベン錯体の反応、メタセシス

カップリング反応 I,II(2回)
① C-C 結合形成（酸化的カップリング、還元的カップリング、クロスカップリング、辻ートロスト型反応）、C-ヘテロ元素結合形成（C-O, C-N, C-B, C-Si 形成,
② C-C 結合形成（ヘック反応、藤原-守谷反応、C-H アリール化）

不活性結合活性化(1回)
C-H活性化（村井反応、ホウ素化、ヒドロアシル化、カルベン・ナイトレン挿入など）、C-C 活性化

重合(1回)

Continue to 有機金属化学２ (2)↓↓↓

有機金属化学２ (2)

配位重合、メタセシス重合、リビングラジカル重合、クロスカップリング重合

工業的反応(1回)
Reppe **反応、ヒドロホルミル化、**Fischer-Tropsch **法、**Monsant **法、アルコールの空気酸化、ワッカー酸化など**

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

学期末に行う筆記試験にて評価する。

[Textbook]

Not used

[Reference books, etc.]

（Reference books）
山本明夫『有機金属化学－基礎と応用』（裳華房 (1982)）
From Bonding to Catalysis, John F『Organotransition Metal Chemistry』（Hartwig, University Science Books (2010)）
山本明夫『有機金属化学－基礎から触媒反応まで』（東京化学同人 (2015)）
小澤文幸，西山久雄『有機遷移金属化学』（朝倉書店 (2016)）

[Regarding studies out of class (preparation and review)]

必要に応じて指示する

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG15 6D837 LJ61 G-ENG16 6D837 LJ61		
Course title <English>	Supramolecular Chemistry Supramolecular Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,Juha Lintuluoto Graduate School of Engineering Senior Lecturer,LANDENBERGER, Kira Beth

Target year		Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Tue.4	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

This course is open to all master and doctoral engineering students. The aim is to enhance students' knowledge of non-covalent molecular interactions found in both synthetic and natural chemical compounds and materials. Additionally, students learn how to choose methods to study and observe non-covalent molecular interactions, and how to measure and evaluate them quantitatively. Throughout the course feedback will be given by instructors. The course will also improve students to gain confidence in studying English of supramolecular topics. The course contents are suitable for a wide variety of chemistry students.

[Course Goals]

Understanding the nature and types of supramolecular interactions, and applying them into various chemical, biological and other materials applications.

[Course Schedule and Contents]

1.Course Introduction & Interactions and methods in Supramolecular Chemistry: Non covalent interactions (H-bonding, pi-pi;lone-pairs and metals, ionic), spectrometric methods (NMR, UV-vis, Fluorescence, CD, Mass) Oct.1

2.Binding Constants, Cooperativity, Complementarity, Preorganization Equilibrium systems, enthalpy and entropy upon binding, quantitative analysis Oct.8

3.Cation Binding with Current Examples Cation binding, binding into anionic host molecules and neutral host molecules Oct.15

4.Anion Binding with Current Examples Anion binding, binding into cationic host molecules, and neutral host molecules Oct.29

5.Neutral molecule binding and Self-Assembly with Current Examples Neutral molecule binding into neutral or charged host molecules, self-binding molecules Nov.5

6.Supramolecular Devices, Sensors and Catalysis with Current Examples Electron transfer, energy transfer, information transfer in supramolecules Nov.12

7. Microcalorimetry Isothermal titration calorimetry to analyze binding thermodynamics of biomolecules. Differential scanning calorimetry to analyze folding thermodynamics of proteins. Nov.19* Lecturer Prof. Oda, Kyoto Prefectural University

8. Crystal Engineering I Crystal engineering, crystal classes, crystal nucleation and growth, commonly found

Continue to Supramolecular Chemistry (2)↓↓↓

Supramolecular Chemistry (2)

intermolecular interactions Nov.26

9. Crystal Engineering II Polymorphism, hydrates and solvates, cocrystals, crystal structure prediction Dec.3

10. Network Solids Zeolites, intercalates, coordination polymers (e.g. MOFs or COFs) Dec.10

11,12. Solid State Inclusion Compounds 1& II Clathrates (structures and applications), catenanes, rotaxanes, cyclodextrins, helicates and helical assemblies, molecular knots and beyond Dec.17* Douple lecture

13. Liquid Crystals Nature and structure of liquid crystals, applications and design, polymeric liquid crystals Jan.7

14.Supramolecular Polymers, Gels and Fibers Supramolecular polymer structure and design, properties, kinetics and reaction mechanics of supramolecular polymers, applications Jan.21

[Class requirement]

Active engagement in lectures, which provide basis for the reports required in this course. Each student is required to submit 4 chosen reports on any given topics during the course.

If you have any concerns or questions regarding the course, please do not hesitate to contact (075)- 383-7065 or landenberger.kirabeth.2x@kyoto-u.ac.jp or (075)-383-2876 or lintuluoto.juhamikael.7u@kyoto-u.ac.jp .

[Method, Point of view, and Attainment levels of Evaluation]

Evaluation: 20% participation (engaging the classes and activity), 80% reports.
*More than 3 unexcused absence can result in course failure.

[Textbook]

Not fixed

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

Students should fulfill the report tasks out of class time (home work).

Continue to Supramolecular Chemistry (3)↓↓↓

Supramolecular Chemistry (3)

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG16 5D839 LJ60		
Course title <English>	合成・生物化学特論A Synthetic Chemistry and Biological Chemistry, Adv,A	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	2	Course offered year/period	2019/Intensive, Second semester

Day/period	Intensive	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

合成・生物化学関連分野の最新の話題を、学外非常勤講師のリレー講義により解説し、合成・生物化学に関連する幅広い領域についての知見を得る.

[Course Goals]

合成・生物化学に関わる基礎的事項と先端研究の内容について理解を深める。

[Course Schedule and Contents]

合成・生物化学関連講義(15)
合成・生物化学関連分野の最新の話題に関する講義

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

平常点およびレポートにより評価する。

[Textbook]

特になし

[Reference books, etc.]

（Reference books）
特になし

[Regarding studies out of class (preparation and review)]

必要に応じて指示する。

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG16 5D841 LJ60		
Course title <English>	合成・生物化学特論C Synthetic Chemistry and Biological Chemistry, Adv,C	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	1	Course offered year/period	2019/Intensive, First semester

Day/period	Intensive	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

合成・生物化学の関連重要分野について、学外非常勤講師による集中講義により詳説する。

[Course Goals]

合成・生物化学に関わる基礎的事項と先端研究の内容について理解を深める。

[Course Schedule and Contents]

合成・生物化学関連講義(7.5回)
合成・生物化学の関連重要分野について、集中講義により詳説する。

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

平常点およびレポートにより評価する。

[Textbook]

特になし

[Reference books, etc.]

（Reference books）
特になし

[Regarding studies out of class (preparation and review)]

必要に応じて指示する。

（Others (office hour, etc.)）

隔年開講

*Please visit KULASIS to find out about office hours.

Numbering code	G-ENG16 5D843 LJ60		
Course title <English>	合成・生物化学特論Ｅ Synthetic Chemistry and Biological Chemistry, Adv,E	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	1	Course offered year/period	2019/Intensive, Second semester

Day/period	Intensive	Class style	Lecture	Language	Japanese

[Outline and Purpose of the Course]

合成・生物化学の関連重要分野について、学外非常勤講師による集中講義により詳説する。

[Course Goals]

合成・生物化学に関わる基礎的事項と先端研究の内容について理解を深める。

[Course Schedule and Contents]

合成・生物化学関連講義 7.5合成・生物化学の関連重要分野について、集中講義により詳説する。

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

平常点およびレポートにより評価する。

[Textbook]

特になし

[Reference books, etc.]

（Reference books）

特になし

[Regarding studies out of class (preparation and review)]

必要に応じて指示する。

（Others (office hour, etc.)）

隔年開講科目

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	合成・生物化学特別実験及演習 Special Experiments and Exercises Synthetic Chemistry and Biological Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	8	Course offered year/period	2019/Intensive, year-round
Day/period	Intensive	Class style	Experiment	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,30times,
,15times,
,15times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	先端マテリアルサイエンス通論（4回コース） Introduction to Advanced Material Science and Technology (4 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	0.5	Course offered year/period	2019/First semester

Day/period	Fri.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

The various technologies used in the field of material science serve as bases for so-called high technologies, and, in turn, the high technologies develop material science. These relate to each other very closely and contribute to the development of modern industries. In this class, recent progresses in material science are briefly introduced, along with selected current topics on new biomaterials, nuclear engineering materials, new metal materials and natural raw materials. The methods of material analysis and future developments in material science are also discussed.

[Course Goals]

To expand your field of vision for material science and to acquire accomplishments to identify the importance of technologies through the classes for developments in material science.

[Course Schedule and Contents]

Topic I Organic Materials
Week 1, Tumor imaging and therapy through photoirradiation
Week 2, Carbon nanorings
Week 3, Synthesis of novel pai-conjugated molecules with main group elements
Week 4, Chemistry of asymmetric catalysis - stereoselective synthesis of opically active pharmaceutical compounds -
Topic II Inorganic Materials
Week 5, Properties of cementitious materials and the future
Week 6, Application of electrical discharge to material and environmental technology
Week 7, Theory of precision cuting, grinding, polishing and related properties of materials
Week 8, Fabrication of inorganic nanofiber by electrospinning
Topic III Polymeric Materials
Week 9-10, Electrical conductivity of conjugated polymers and application to organic Electronics
Week 11-12, An introduction to smart shape changing materials

[Class requirement]

Each topic consists of four lectures.
This course requests to choose one topic from provided three topics in advance.
It is prohibited to change the topic after registration.
We may select students who can attend the class before starting the class.
Students who intend to join the course are required to submit the application form through the web site which will be informed in the advance.

Continue to 先端マテリアルサイエンス通論（4回コース）(2)↓↓↓

先端マテリアルサイエンス通論（4回コース）(2)

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments is employed.
For the topic which the students chose, they must attend minimum three lectures and submit minimum two assignments evaluated as "passed".

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.
It is prohibited to attend the lectures of the other topics than the students chose.
All the students are requested to attend the guidance which will be held on the first class.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	先端マテリアルサイエンス通論（8回コース） Introduction to Advanced Material Science and Technology (8 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1	Course offered year/period	2019/First semester

Day/period	Fri.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

The various technologies used in the field of material science serve as bases for so-called high technologies, and, in turn, the high technologies develop material science. These relate to each other very closely and contribute to the development of modern industries. In this class, recent progresses in material science are briefly introduced, along with selected current topics on new biomaterials, nuclear engineering materials, new metal materials and natural raw materials. The methods of material analysis and future developments in material science are also discussed.

[Course Goals]

To expand your field of vision for material science and to acquire accomplishments to identify the importance of technologies through the classes for developments in material science.

[Course Schedule and Contents]

Topic I Organic Materials
Week 1, Tumor imaging and therapy through photoirradiation
Week 2, Carbon nanorings
Week 3, Synthesis of novel pai-conjugated molecules with main group elements
Week 4, Chemistry of asymmetric catalysis - stereoselective synthesis of opically active pharmaceutical compounds -
Topic II Inorganic Materials
Week 5, Properties of cementitious materials and the future
Week 6, Application of electrical discharge to material and environmental technology
Week 7, Theory of precision cuting, grinding, polishing and related properties of materials
Week 8, Fabrication of inorganic nanofiber by electrospinning
Topic III Polymeric Materials
Week 9-10, Electrical conductivity of conjugated polymers and application to organic Electronics
Week 11-12, An introduction to smart shape changing materials

[Class requirement]

Each topic consists of four lectures.
This course requests to choose two topics from provided three topics in advance.
It is prohibited to change the topics after registration.
We may select students who can attend the class before starting the class.
Students who intend to join the course are required to submit the application form through the web site which will be informed in the advance.

Continue to 先端マテリアルサイエンス通論（8回コース）(2)↓↓↓

先端マテリアルサイエンス通論（8回コース）(2)

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments for each topic is employed.
For each topic which the students chose, they must attend minimum three lectures and submit minimum two assignments evaluated as "passed".

[Textbook]

Not used

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.
It is prohibited to attend the lectures of the other topic than the students chose.
All the students are requested to attend the guidance which will be held on the first class.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	先端マテリアルサイエンス通論（12回コース） Introduction to Advanced Material Science and Technology (12 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1.5	Course offered year/period	2019/First semester

Day/period	Fri.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

The various technologies used in the field of material science serve as bases for so-called high technologies, and, in turn, the high technologies develop material science. These relate to each other very closely and contribute to the development of modern industries. In this class, recent progresses in material science are briefly introduced, along with selected current topics on new biomaterials, nuclear engineering materials, new metal materials and natural raw materials. The methods of material analysis and future developments in material science are also discussed.

[Course Goals]

To expand your field of vision for material science and to acquire accomplishments to identify the importance of technologies through the classes for developments in material science.

[Course Schedule and Contents]

Topic I Organic Materials
Week 1, Tumor imaging and therapy through photoirradiation
Week 2, Carbon nanorings
Week 3, Synthesis of novel pai-conjugated molecules with main group elements
Week 4, Chemistry of asymmetric catalysis - stereoselective synthesis of opically active pharmaceutical compounds -
Topic II Inorganic Materials
Week 5, Properties of cementitious materials and the future
Week 6, Application of electrical discharge to material and environmental technology
Week 7, Theory of precision cuting, grinding, polishing and related properties of materials
Week 8, Fabrication of inorganic nanofiber by electrospinning
Topic III Polymeric Materials
Week 9-10, Electrical conductivity of conjugated polymers and application to organic Electronics
Week 11-12, An introduction to smart shape changing materials

[Class requirement]

Each topic consists of four lectures.
This course requests to take all provided three topics.
We may select students who can attend the class before starting the class.
Students who intend to join the course are required to submit the application form through the web site which will be informed in the advance.

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments for each topics is employed.
For each topic, the students must attend minimum three lectures and submit minimum two assignments

Continue to 先端マテリアルサイエンス通論（12回コース）(2)↓↓↓

evaluated as "passed".

[Textbook]

Not used

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	現代科学技術特論（4回コース） Advanced Modern Science and Technology (4 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	0.5	Course offered year/period	2019/Second semester
Day/period	Thu.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

Engineering/Engineers have been expected to fulfill key roles among social issues and others, such as energy, environment and resource. This class introduces cutting edge science and technologies from their backgrounds, research and development, to problems for the practical applications. Group discussions will be done for further understanding of the topics of the course.

[Course Goals]

The students understand of each technology towards social issues to be solved by engineers. In addition, the students learn the importance for engineers to have multidisciplinary mind and understand the significance of engineering to realize sustainable development.

[Course Schedule and Contents]

Topic I Computer-Aided Analyses for Fluid
Week 1-2, Lagrangian Meshfree Methods as New Generation Computational Tools
Week 3, CFD in Process Systems Engineering
Week 4, CFD in Hydraulic Engineering
Topic II Utilization of Light Energy
Week 5-6, Photochemistry of Organic Molecules
Week 7, Solar Energy Conversion Using Semiconductor Photocatalysts
Week 8, Efficiency Improvement in Solar Cells by Photonic Nano Structures
Topic III Materials Analysis
Week 9-10,Crystal Structure Analysis by Power X-ray Diffraction Measurement
Week 11-12, Principles and Applications of Fluorescence Spectroscopy

[Class requirement]

Each topic consists of four lectures.
This course requests to choose one topic from provided three topics in advance.
It is prohibited to change the topic after registration.

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments is employed.
For the topic which the students chose, they must attend minimum three lectures and submit minimum two assignments evaluated as "passed".

Continue to 現代科学技術特論（4回コース）(2)↓↓↓

現代科学技術特論（4回コース）(2)

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.
It is prohibited to attend the lectures of the other topics than the students chose.
All the students are requested to attend the guidance which will be held on the first class.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	現代科学技術特論（8回コース） Advanced Modern Science and Technology (8 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1	Course offered year/period	2019/Second semester
Day/period	Thu.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

Engineering/Engineers have been expected to fulfill key roles among social issues and others, such as energy, environment and resource. This class introduces cutting edge science and technologies from their backgrounds, research and development, to problems for the practical applications. Group discussions will be done for further understanding of the topics of the course.

[Course Goals]

The students understand of each technology towards social issues to be solved by engineers. In addition, the students learn the importance for engineers to have multidisciplinary mind and understand the significance of engineering to realize sustainable development.

[Course Schedule and Contents]

Topic I Computer-Aided Analyses for Fluid
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Week 4, CFD in Hydraulic Engineering
Topic II Utilization of Light Energy
Week 5-6, Photochemistry of Organic Molecules
Week 7, Solar Energy Conversion Using Semiconductor Photocatalysts
Week 8, Efficiency Improvement in Solar Cells by Photonic Nano Structures
Topic III Materials Analysis
Week 9-10,Crystal Structure Analysis by Power X-ray Diffraction Measurement
Week 11-12, Principles and Applications of Fluorescence Spectroscopy

[Class requirement]

Each topic consists of four lectures.
This course requests to choose two topics from provided three topics in advance.
It is prohibited to change the topics after registration.

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments for each topic is employed.
For each topic which the students chose, they must attend minimum three lectures and submit minimum two assignments evaluated as "passed".

Continue to 現代科学技術特論（8回コース）(2)↓↓↓

現代科学技術特論（8回コース）(2)

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.
It is prohibited to attend the lectures of the other topic than the students chose.
All the students are requested to attend the guidance which will be held on the first class.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	現代科学技術特論（12回コース） Advanced Modern Science and Technology (12 times course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1.5	Course offered year/period	2019/Second semester
Day/period	Thu.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

Engineering/Engineers have been expected to fulfill key roles among social issues and others, such as energy, environment and resource. This class introduces cutting edge science and technologies from their backgrounds, research and development, to problems for the practical applications. Group discussions will be done for further understanding of the topics of the course.

[Course Goals]

The students understand of each technology towards social issues to be solved by engineers. In addition, the students learn the importance for engineers to have multidisciplinary mind and understand the significance of engineering to realize sustainable development.

[Course Schedule and Contents]

Topic I Computer-Aided Analyses for Fluid
Week 1-2, Lagrangian Meshfree Methods as New Generation Computational Tools
Week 3, CFD in Process Systems Engineering
Week 4, CFD in Hydraulic Engineering
Topic II Utilization of Light Energy
Week 5-6, Photochemistry of Organic Molecules
Week 7, Solar Energy Conversion Using Semiconductor Photocatalysts
Week 8, Efficiency Improvement in Solar Cells by Photonic Nano Structures
Topic III Materials Analysis
Week 9-10,Crystal Structure Analysis by Power X-ray Diffraction Measurement
Week 11-12, Principles and Applications of Fluorescence Spectroscopy

[Class requirement]

Each topic consists of four lectures.
This course requests to take all provided three topics.

Continue to 現代科学技術特論（12回コース）(2)↓↓↓

現代科学技術特論（12回コース）(2)

[Method, Point of view, and Attainment levels of Evaluation]

The average score of the best two assignments for each topics is employed.
For each topic, the students must attend minimum three lectures and submit minimum two assignments evaluated as "passed".

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

It is prohibited to change the registered course.

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	先端科学機器分析及び実習Ⅰ Instrumental Analysis,Adv.I	Affiliated department, Job title,Name	Graduate School of Engineering Professor,OOE KOUICHI

Target year		Number of credits	1	Course offered year/period	2019/First semester
Day/period	Thu.4,5	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,1time,
,1time,
,1time,
,1time,
,1time,
,1time,
,2times,
,2times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	先端科学機器分析及び実習II Instrumental Analysis,Adv.II	Affiliated department, Job title,Name	Graduate School of Engineering Professor,OOE KOUICHI

Target year		Number of credits	1	Course offered year/period	2019/Second semester
Day/period	Thu.4,5	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,1time,
,2times,
,2times,
,2times,
,2times,
,2times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	現代科学技術の巨人セミナー「知のひらめき」（6Hコース） Frontiers in Modern Scinece and Technology (6H course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	0.5	Course offered year/period	2019/Intensive, First semester

Day/period	Intensive	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

This course provides lectures and panel discussions by lecturers inside and outside the campus who have a remarkable achievement in engineering and are active as international leaders.

[Course Goals]

This course cultivates the ability to develop familiar problem consciousness into a big concept through utilizing the materials of advanced fields in each field. This course also shows how leaders have improved their response to problems. Through this course, students learn fundamental culture, and the importance of human growth.

[Course Schedule and Contents]

Topic 1,2times,Detail will be announced later
Topic 2,2times,Detail will be announced later

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Separate four classes will be provided. One class has three hours. Each class will assign a report. Evaluation bases on the assignment and class contribution. The classes will be opened on Saturdays. In 6H course, students have to select two classes and will earn 0.5 credits.

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

Continue to 現代科学技術の巨人セミナー「知のひらめき」（6Hコース）(2)↓↓↓

現代科学技術の巨人セミナー「知のひらめき」（6Hコース）(2)

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	現代科学技術の巨人セミナー「知のひらめき」（12Hコース） Frontiers in Modern Scinece and Technology (12H course)	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1	Course offered year/period	2019/Intensive, First semester
Day/period	Intensive	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

This course provides lectures and panel discussions by lecturers inside and outside the campus who have a remarkable achievement in engineering and are active as international leaders.

[Course Goals]

This course cultivates the ability to develop familiar problem consciousness into a big concept through utilizing the materials of advanced fields in each field. This course also shows how leaders have improved their response to problems. Through this course, students learn fundamental culture, and the importance of human growth.

[Course Schedule and Contents]

Topic 1,2times,Detail will be announced later
Topic 2,2times,Detail will be announced later
Topic 3,2times,Detail will be announced later
Topic 4,2times,Detail will be announced later

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

Separate four classes will be provided. One class has three hours. Each class will assign a report. Evaluation bases on the assignment and class contribution. The classes will be opened on Saturdays. In 12H course, students have to complete all four classes and will earn 1 credits.

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

Continue to 現代科学技術の巨人セミナー「知のひらめき」（12Hコース）(2)↓↓↓

現代科学技術の巨人セミナー「知のひらめき」（12Hコース）(2)

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	実践的科学英語演習Ⅰ Exercise in Practical Scientific English I	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,NISHIKAWA MIKAKO Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU

Target year		Number of credits	1	Course offered year/period	2019/First semester
Day/period	Thu.4,5	Class style	Seminar	Language	Japanese and English

[Outline and Purpose of the Course]

This course is open to all master and doctoral engineering students.
It is designed to help students understand how to write a research paper step by step.
In this course, the students will write a short research paper (i.e. Extended Research Abstract for Proceeding. approx. 1000 -1500 words) on a topic drawn from assigned readings.

[Course Goals]

The primary goal of this course is to deepen an understanding of the main features of each part of a scientific paper (IMRaD).
Throughout the course, students will develop the core competencies required for language, grammar, and style to produce a research manuscript in English.

[Course Schedule and Contents]

Unit 1. Course Overview
Introduction to writing scientific research articles

Unit 2. Introduction
Raising awareness of the register of scientific research articles (genre, audience, purpose)

Unit 3. Preparing to Write (1)
Writing a proposal for a research paper, using corpus-based approach (Exercise: Creating own Corpus)

Unit 4. Preparing to Write (2)
Paraphrasing ideas from source texts, using citations and references in formal writing

Unit 5. Writing Processes (1) Abstract
Identifying the moves for an Abstract section by hint expressions

Unit 6. Writing Processes (2) Abstract-continued
Writing an Abstract (Title), Peer Feedback

Unit 7. Writing Processes (3) Introduction

Continue to 実践的科学英語演習Ⅰ(2)↓↓↓

実践的科学英語演習Ⅰ(2)

Identifying the moves for an Introduction section by hint expressions

Unit 8. Writing Processes (4) Introduction-continued
Writing an Introduction section, Peer Feedback

Unit 9. Writing Processes (5) Method
Writing a Method section, Peer Feedback

Unit 10. Writing Processes (6) Results
Writing a Result section, Peer Feedback

Unit 11. Writing Processes (7) Discussions and Conclusion
Writing a Discussion and a Conclusion section

Unit 12. Cover letter to reviewers
Writing a cover letter to reviewers and how to respond to reviewers

Unit 13. Monitoring and Revising (1)
Submitting the paper online to receive feedback from instructors

Unit 14. Monitoring and Revising (2)
Revising a paper based on peer feedback

Unit 15. Submission of the Final Paper

[Class requirement]

Students who intend to join this course must attend the first class.

[Method, Point of view, and Attainment levels of Evaluation]

Evaluation based on 30% participation, 40% reports, 30% final paper *More than twice unexcused absence can result in course failure

[Textbook]

Handout materials will be supplied by the instructor.

[Reference books, etc.]

（Reference books）
Textbooks (for reference)

ALESS (2012). Active English for Science-英語で科学する-レポート、論文、プレゼンテーション. The University of Tokyo Press.

野口ジュディー・深山晶子・岡本真由美.（2007）.『理系英語のライティング』. アルク

Continue to 実践的科学英語演習Ⅰ(3)↓↓↓

実践的科学英語演習Ⅰ(3)

[Regarding studies out of class (preparation and review)]

Students will need to spend a reasonable amount of time to complete their own piece of writing for the course.

（Others (office hour, etc.)）

We may restrict the class size to enhance students' learning.
Students who intend to join the course are required to attend the first-day guidance.

Office Hours: (by appointment) nishikawa.mikako7w@kyoto-u.ac.jp (Ext. 2052)

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	科学技術者のためのプレゼンテーション演習 Professional Scientific Presentation Exercises	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,Juha Lintuluoto

Target year		Number of credits	1	Course offered year/period	2019/First semester

Day/period	Thu.5	Class style	Seminar	Language	English

[Outline and Purpose of the Course]

It is imperative for future engineers to be able to communicate and deliver effectively scientific information to large variety of audiences. This skill enables engineers to share and absorb information to more extended audiences, and facilitates success in selling ideas and products, publishing and team working. The purpose of this course is to teach the basic rules needed for successful professional scientific presentation, both orally and written. The course also prepares students to deliver scientific information presentations to wide audiences. The course is consisted of excessive exercises, of which the student should complete seven (7) tasks. The course holds 3-4 tasks for oral presentation exercises, and 3-4 tasks for professional scientific writing exercises. The exact number of both exercises is adjusted for each studentrsquos needs. The course is aimed for doctor course (DC) students, both Japanese and Foreign nationals

[Course Goals]

This course is aimed to foster engineering studentsrsquo scientific presentation skills. The successfully course completed students will be able to express and present complicated and specific scientific information at more generally understandable level. The students will also be able to pose relevant questions and effectively answer to the wide variety of questions.

[Course Schedule and Contents]

1time,Guidance and Professional presentation rules and etiquette
3times,Oral presentations amp questioning I, Written report I
3times,Oral presentations amp questioning II, Written report II
3times,Oral presentations amp questioning III, Written report III
3times,Oral presentations amp questioning IV, Written report IV
2times,Course summary and discussion

[Class requirement]

-Fundamental skills about scientific presentation
-Advanced English skills
-Sufficient personal research results

[Method, Point of view, and Attainment levels of Evaluation]

Reports, class activity, presentation

Continue to 科学技術者のためのプレゼンテーション演習(2)↓↓↓

科学技術者のためのプレゼンテーション演習(2)

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

Will be informed if necessary.

（Related URLs）

(The web-site is listed in the home page of the GL education center.)

[Regarding studies out of class (preparation and review)]

3 times Oral, 4 times writing（Total 7 times）
or
3 times Oral, 4 times writing（Total 7 times）

（Others (office hour, etc.)）

Students are requested to check in advance whether the credit of this course is counted as the unit for graduation requirement at department level. Course starts at April 12th, and the 1st lesson is repeated on April 19th. The course schedule is irregular. Most classes are biweekly, the detailed schedule is provided at the 1st lecture.

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	工学と経済（上級） Advanced Engineering and Economy	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,Juha Lintuluoto

Target year		Number of credits	2	Course offered year/period	2019/First semester
Day/period	Tue.5	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

Engineering economics plays central role in any industrial engineering project. For an engineer, it is important to apply the engineering know-how with the economic analysis skills to obtain the best available materials, methods, devices, etc. in the most economical way. This course is aimed to teach engineering students the basic economic methods to manage economically an engineering project. In addition, the report writing on various engineering economic issues prepares to write reports in a professional form. The lab sessions are meant for the verbal skills improvement as well as improvement of analytical thinking. The topics are of current relevant topics Small-group brain-storming method is used. The exercise sessions cover the use of Ms-Excel for various quantitative economic analyses.

[Course Goals]

This course is aimed to strengthen engineering studentsrsquo skills in economics. The course concept is to teach students selectively those subjects which serve as major tools to solve economic tasks in engineering environment. The reports and lab sessions provide students stimulating and analytical thinking requiring tasks, and presentation skills training is an important part of this course.

[Course Schedule and Contents]

Student orientation and Introduction to engineering economy,1time,Course contents, goals
Cost concepts and design economics,1time,Cost terminology and classification
Cost estimation techniques,1time,WBS for cost estimation, estimation techniques (indexes, unit, factor, power-sizing, learning curve, CER, top down, bottom up), target costing
The time value of money,1time,Simple interest, compound interest, economic equivalence concept, cash-flow diagrams, PW, FW, AW
Evaluating a single project,1time,MARR, present wort method, bond value, capitalized worth, internal rate of return, external rate of return, payback method
Comparison and selection among alternatives,1time,Investment and cost alternatives, study period, equal and unequal useful lives, rate-of-return method, imputed market value
Depreciation and income taxes,1time,SL and DB depreciation methods, book value, after-tax MARR, marginal income tax rate, gain(loss) on asset disposal, after-tax economic analysis general procedure, EVA,
Price changes and exchange rates,1time,Actual dollars, real dollars, inflation, fixed and responsive annuities, exchange rates, purchasing power
Replacement analysis,1time,Determining economic life of challenger, determining economic life of defender, abandonment, after-tax replacement study
Evaluating projects with the benefit-cost ratio method,1time,Benefits, costs, dis-benefits, self-liquidating projects, multi-purpose projects, interest rate vs. public project, conventional B-C ratio PW and AW method, modified B-C ratio PW and AW method
Breakeven and sensitivity analysis,1time,Breakeven analysis, sensitivity analysis, spider plot
Probabilistic risk analysis,1time,Sources of uncertainty, discrete and continuous variables, probability trees, Monte Carlo simulation example, decision trees, real options analysis

Continue to 工学と経済（上級）(2)↓↓↓

工学と経済（上級）(2)

The capital budgeting process,1time,Capital financing and allocation, equity capital and CAPM, WACC, WACC relation to MARR, opportunity cost
Decision making considering multiattributes,1time,Non-compensatory models (dominance, satisficing, disjunctive resolution, lexicography), compensatory models (non-dimensional scaling, additive weight)
Final test,1time,90 minutes, concept questions, calculation task (option of choice)
,times,Additionally, students will submit three reports during the course on given engineering economy subjects. Also, required are the five lab participations (ca.60 min/each) for each student. Additionally, three exercise sessions (ca.60 min/each), where use of Ms-Excel will be practiced for solving various engineering economy tasks, should be completed

[Class requirement]

-This course is highly recommended for those who attend ldquoProject Management in Engineering course , Small group working method

[Method, Point of view, and Attainment levels of Evaluation]

Final test, reports, class activity

[Textbook]

Engineering Economy 15th ed. William G. Sullivan (2011)

[Reference books, etc.]

（Reference books）

Will be informed if necessary.

（Related URLs）

(The web-site is listed in the home page of the GL education center.)

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

Students are requested to check in advance whether the credits of this course are counted as the units for graduation requirement at department level. The course starts on Oct.2nd.

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	工学研究科国際インターンシップ１ International Internship in Engineering 1	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,NISHIKAWA MIKAKO

Target year		Number of credits	1	Course offered year/period	2019/Intensive, year-round
Day/period	Intensive	Class style	Practical training	Language	English

[Outline and Purpose of the Course]

Acquisition of international skills with the training of foreign language through the internship programs hosted by the University, the Graduate School of Engineering, or The Department the registrant belongs to.

[Course Goals]

Acquisition of international skills with the training of foreign language.

[Course Schedule and Contents]

Overseas Internship, **1** times,The contents to be acquired should be described in the brochure of each internship program.
Final Presentation, **1** times,A presentation by the student is required followed by discussion among participants.

[Class requirement]

Described in the application booklet for each internship program. The registrant is requested to have enough language skills for the participation.

[Method, Point of view, and Attainment levels of Evaluation]

Merit rating is performed based on the presentation or the report(s) after the participation in each internship program. Each department is responsible to identify the number of credits to be granted to the student of the department, if the credits are included in the mandatory ones. The Global Leadership Engineering Education Center takes the role to evaluate the credits if the department the student belongs to deals the credits as optional ones. The number of credits to be earned is 1 and 2, respectively to the subjects International Internship in Engineering 1 and 2 depending on the period and the contents of the internship program the students has participated in.

[Textbook]

Not Applicable

[Reference books, etc.]

（Reference books）
Not Applicable

Continue to 工学研究科国際インターンシップ１(2)↓↓↓

工学研究科国際インターンシップ１(2)

（Related URLs）

(Not Applicable)

[Regarding studies out of class (preparation and review)]

Not Applicable

（Others (office hour, etc.)）

It is required for students to check if the internship program to participate in could be evaluated as part of mandatory credits or not and could earn how many credits before the participation to the department or educational program the student in enrolled. If the credit could not be treated as mandatory ones, get in touch with the Global Leadership Engineering Education Center.

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	工学研究科国際インターンシップ２ International Internship in Engineering 2	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,NISHIKAWA MIKAKO

Target year		Number of credits	2	Course offered year/period	2019/Intensive, year-round

Day/period	Intensive	Class style	Practical training	Language	English

[Outline and Purpose of the Course]

Acquisition of international skills with the training of foreign language through the internship programs hosted by the University, the Graduate School of Engineering, or The Department the registrant belongs to.

[Course Goals]

Acquisition of international skills with the training of foreign language. Detailed objectives should be described in each program.

[Course Schedule and Contents]

Overseas Internship, **1** times,The contents to be acquired should be described in the brochure of each internship program.
Final Presentation, **1** times,A presentation by the student is required followed by discussion among participants.

[Class requirement]

Described in the application booklet for each internship program. The registrant is requested to have enough language skills for the participation.

[Method, Point of view, and Attainment levels of Evaluation]

Merit rating is performed based on the presentation or the report(s) after the participation in each internship program. Each department is responsible to identify the number of credits to be granted to the student of the department, if the credits are included in the mandatory ones. The Global Leadership Engineering Education Center takes the role to evaluate the credits if the department the student belongs to deals the credits as optional ones. The number of credits to be earned is 1 and 2, respectively to the subjects International Internship in Engineering 1 and 2 depending on the period and the contents of the internship program the students has participated in.

[Textbook]

Not Applicable.

Continue to 工学研究科国際インターンシップ２(2)↓↓↓

工学研究科国際インターンシップ２(2)

[Reference books, etc.]

（Reference books）

Not Applicable.

（Related URLs）

(Not Applicable.)

[Regarding studies out of class (preparation and review)]

Not Applicable.

（Others (office hour, etc.)）

It is required for students to check if the internship program to participate in could be evaluated as part of mandatory credits or not and could earn how many credits before the participation to the department or educational program the student in enrolled. If the credit could not be treated as mandatory ones, get in touch with the Global Leadership Engineering Education Center.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	エンジニアリングプロジェクトマネジメント Project Management in Engineering	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU Graduate School of Engineering Associate Professor,Juha Lintuluoto

Target year		Number of credits	2	Course offered year/period	2019/First semester
Day/period	Fri.4	Class style	Lecture	Language	English

[Outline and Purpose of the Course]

This course provides a basic knowledge required for the project management in various engineering fields such as process design, plant design, construction, and R&D project. Some lectures are provided by visiting lecturers from industry and public works who have many experiences on actual engineering projects.

[Course Goals]

This course will help students gain a fundamental knowledge of what project management in engineering is. Throughout the course, students will learn various tools applied in project management. Students will also understand the importance of costs and money, risks, leadership, and environmental assessment in managing engineering projects. This course is followed with the course Exercise on Project Management in Engineering in the second semester.

[Course Schedule and Contents]

Week 1, Course guidance
Week 2-3, Introduction to project management
Week 4, Project scheduling
Week 5-7, Tools for project management, cost, and cash flows
Week 8-9, Team organization and administration
Week 10, Negotiation skills/tactics/examples in business marketing
Week 11, Environmental impact assessment
Week 12-13, Risk management
Week 14, Project management for engineering procurement construction business
Week 15, Feedback

[Class requirement]

We may restrict the class size to enhance students' learning.
Students who intend to join the course are required to attend the first class.

Continue to エンジニアリングプロジェクトマネジメント(2)↓↓↓

エンジニアリングプロジェクトマネジメント(2)

[Method, Point of view, and Attainment levels of Evaluation]

Evaluated by class contribution (or level of understanding) at each class (60%) and assignments (40%)

[Textbook]

Course materials will be provided.

[Reference books, etc.]

（Reference books）

Lock, Dennis 『Project Management, 10th edition』 （Gower Publishing Ltd.）ISBN:1409452697
Cleland, David L., and Ireland, Lewis R. 『Project Management: Strategic Design and Implementation, 5th edition』 （McGraw-Hill Professional）ISBN:007147160X
Miller, Roger and Lessard, Donald R. 『The strategic management of large engineering projects, Shaping Institutions, Risks, and Governance』 （The MIT Press）ISBN:9780262526982

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

This course requests students to prepare a class in advance becouse some classes will be done by an interactive style as necessary.

（Others (office hour, etc.)）

We may restrict the class size to enhance students' learning.
Students who intend to join the course are required to attend the first class.

*Please visit KULASIS to find out about office hours.

Numbering code			
Course title <English>	エンジニアリングプロジェクトマネジメント演習 Exercise on Project Management in Engineering	Affiliated department, Job title,Name	Graduate School of Engineering Senior Lecturer,MATSUMOTO RIYOUSUKE Graduate School of Engineering Senior Lecturer,ASHIDA RIYUUICHI Graduate School of Engineering Senior Lecturer,MAEDA MASAHIRO Graduate School of Engineering Senior Lecturer,YOROZU KAZUAKI Graduate School of Engineering Senior Lecturer,KANEKO KENTAROU Graduate School of Engineering Associate Professor,Juha Lintuluoto

Target year		Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Fri.4,5	Class style	Seminar	Language	English

[Outline and Purpose of the Course]

In this course, students will apply the engineering know-how and the skills of management, and group leadership which they learned in the course of Project Management in Engineering to build and carry out a virtual inter-engineering project. This course provides a forum where students' team-plan based on ideas and theories, decision making, and leadership should produce realistic engineering project outcomes. The course consists of intensive group work, presentations, and a few intermediate discussions. A final report will be required.

[Course Goals]

This course prepares engineering students to work with other engineers within a large international engineering project. In particular this course will focus on leadership and management of projects along with applied engineering skills where the students learn various compromises, co-operation, responsibility, and ethics.

[Course Schedule and Contents]

Week 1, Introduction to Exercise on Project Management in Engineering, Lecture on tools for the Project management in engineering, Practice and Project proposal.
Week 2, Group finalizations & Project selections.
Week 3-7, Group work, Project preliminary structures, Task list, WBS, Cost, Gant chart.
Week 8, Mid-term presentation.
Week 9-11, Group work, Leadership structuring, Risk Management, Environmental Impact Assessment.
Week 12, Presentation.
Each project group may freely schedule the group works within given time frame. The course instructors are available if any need is required.
Some lectures will be provided such as Task list, WBS, Cost, Gant chart, Leadership structuring, Risk Management, Environmental Impact Assessment, and more.

Continue to エンジニアリングプロジェクトマネジメント演習(2)↓↓↓

エンジニアリングプロジェクトマネジメント演習(2)

[Class requirement]

Fundamental skills about group leading and communication, scientific presentation.
We may restrict the class size to enhance students' learning.
Students who intend to join the course are required to attend the first class.

[Method, Point of view, and Attainment levels of Evaluation]

Report, presentations, class activity (at least 10 times attendance including mid-term and final presentations).

[Textbook]

Course materials will be provided if necessary.

[Reference books, etc.]

（Reference books）

Will be informed if necessary.

（Related URLs）

http://www.glc.t.kyoto-u.ac.jp/grad(The home page of the engineering education research center)

[Regarding studies out of class (preparation and review)]

Students are requested to prepare for group work, mid-term presentation and finel presentation.

（Others (office hour, etc.)）

We may restrict the class size to enhance students' learning.
Students who intend to join the course are required to attend the first class.

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	合成・生物化学特別セミナー１ Special Seminar 1 in Synthetic Chemistry and Biological Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	2	Course offered year/period	2019/Intensive, First semester
Day/period	Intensive	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,15times,

,,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	合成・生物化学特別セミナー２ Special Seminar 2 in Synthetic Chemistry and Biological Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	2	Course offered year/period	2019/Intensive, Second semester
Day/period	Intensive	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,15times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.

未更新

Numbering code			
Course title <English>	合成・生物化学特別セミナー３ Special Seminar 3 in Synthetic Chemistry and Biological Chemistry	Affiliated department, Job title,Name	Graduate School of Engineering Professor,HAMACHI ITARU

Target year		Number of credits	2	Course offered year/period	2019/Intensive, Second semester
Day/period	Intensive	Class style	Seminar	Language	Japanese

[Outline and Purpose of the Course]

[Course Goals]

[Course Schedule and Contents]

,15times,

[Class requirement]

None

[Method, Point of view, and Attainment levels of Evaluation]

[Textbook]

[Reference books, etc.]

（Reference books）

[Regarding studies out of class (preparation and review)]

（Others (office hour, etc.)）

*Please visit KULASIS to find out about office hours.