

Numbering code					
Course title <English>	工業数学 A 1 Applied Mathematics A1	Affiliated department, Job title,Name	Graduate School of Informatics Associate Professor.SHIBAYAMA MITSURU		
Target year	2nd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Thu.2	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
Complex analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex numbers. Students will study the foundation and apply it to compute some integral.					
[Course Goals]					
To understand properties of complex functions with a skill for evaluation of integrals appearing in applied mathematics and physics.					
[Course Schedule and Contents]					
1. Complex function 2. Holomorphic functions 3. Elementary functions 4. Integrals in the complex plane 5. Cauchy's integral theorem 6. Power series 7. Taylor series 8. Isolated singularities 9. Laurent series 10. Multivalued functions 11. Analytic continuation 12. Residue 13. Integrals including trigonometric functions 14. Application to improper integral 15. Point at infinity and Riemann sphere					
[Class requirement]					
Calculus, Linear algebra					
[Method, Point of view, and Attainment levels of Evaluation]					
Evaluation depends mainly on marks of examination, but marks of exercises are taken into account when needed.					
Continue to 工業数学 A 1 (2)					

Numbering code					
Course title <English>	工業数学 F 1 (機材工不原 : 学番奇数) Applied Mathematics for Engineering F1	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor.NISHIKAWA MASAAKI		
Target year	2nd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Tue.3	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
[Introduction to complex analysis and some applications]					
The objective is to explain the fundamentals of complex analysis, considering the application to engineering and science. The differential and integral calculus of complex functions, the relevant basic ideas, and the applications are introduced.					
[Course Goals]					
Understanding the basics of complex analysis and obtaining ability to practice it					
[Course Schedule and Contents]					
Definition of complex and complex plane, 1time, Differential of complex functions and Cauchy-Riemann relation, 2times, Concept and examples of regular functions, 2times, Line integral of complex functions, 1time, Cauchy's theorem and integral formula, 2times, Taylor and Laurent series, 2times, Singular points and residue theorem, 2times, Application to definite integral, 1time, Concept of conformal mapping, other topics, 1time, Confirmation of learning achievement, 1time, Feedback, 1time,					
[Class requirement]					
Fundamentals of differential and integral calculus					
[Method, Point of view, and Attainment levels of Evaluation]					
【 Evaluation method 】 Evaluation will be mainly based on regular examination. In some cases, evaluation for homework (short reports: about four times) will be also considered. (In these cases, the ratio of the evaluations for regular examination and homework is about 9:1.) 【 Evaluation standard 】 Evaluation will be based on class registration guideline.					
[Textbook]					
A. Fujimoto 『 Outline of complex analysis (Fukuso-kaisekigaku Gaisetsu) 』 (Baifukan) ISBN:978-4563005719 (in Japanese, published in 1990.)					
Continue to 工業数学 F 1 (機材工不原 : 学番奇数) (2)					

工業数学 A 1 (2)	
[Textbook]	
Not used	
[Reference books, etc.]	
(Reference books) Lars V. Ahlfors 『 Complex Analysis 』 (McGraw-Hill Education) ISBN:978-0070006577	
(Related URLs) (KULASIS)	
[Regarding studies out of class (preparation and review)]	
Students need to solve exercises.	
(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.	

工業数学 F 1 (機材工不原 : 学番奇数) (2)	
[Reference books, etc.]	
(Reference books) To be referred to during the course	
[Regarding studies out of class (preparation and review)]	
Homework (short reports) for the problems stated in the textbooks will be assigned.	
(Others (office hour, etc.)) *Please visit KULASIS to find out about office hours.	

Numbering code					
Course title <English>	制御工学 2 (宇) Control Engineering 2	Affiliated department, Job title,Name	Graduate School of Engineering Professor,FUJIMOTO KENJI		
Target year	3rd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Mon.3	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
This course treats modern control theory based on state-space models of dynamical systems. It includes modeling, analysis and synthesis methods of feedback control systems.					
[Course Goals]					
Students will learn state-space equations, stability analysis, feedback controller synthesis and observer design.					
[Course Schedule and Contents]					
The basic schedule of the course is as follows.					
1. Introductions 2. Ordinary differential equations and state-space equations 3. Eigenvalues, eigenvectors and systems 4. Solutions of state-space equations 5. Stability 6. Transfer functions and realization theory 7. Controllability 8. Observability 9. Coordinate transformation and canonical decomposition 10. Controllability canonical form 11. Observability canonical form 12. State feedback control 13. State observers and output feedback control 14. Optimal control and Kalman filters 15. Summary					
[Class requirement]					
Students are required to take basic knowledge of linear algebra and differential equation theory. It is also preferable to take Control Engineering 1.					
[Method, Point of view, and Attainment levels of Evaluation]					
The points will be evaluated based on the score of the paper test. The report assignment and attendance point may add auxiliary points. The goal of this course is to understand the outline of the modern control and to acquire the ability to design the control system.					
[Textbook]					
Not used					
----- Continue to 制御工学 2 (宇) (2)					

Numbering code					
Course title <English>	生産工学 (機) Production Engineering	Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,IZUI KAZUHIRO		
Target year	3rd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.2	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
This course deals with how to construct and operate a manufacturing system of a mechanical product.					
[Course Goals]					
The goal is to understand the concept of a manufacturing system, and to become able to handle related basic decision-making problems.					
[Course Schedule and Contents]					
Introduction,1time,The overall concept of a manufacturing system is given. Industrial Economics,2times,After introducing the concept of the manufacturing cost and cash flow, how to make decisions using the concept (for example, the DCF method for investment decisions) is addressed. Production amp Operations Management,2times,Demand forecasting, production planning, inventory management, MRP, JIT, etc. are covered. .3times, Production Scheduling,2times,Basic approaches for single machine scheduling, flow shop scheduling, job shop scheduling, and project scheduling are introduced. Plant Layout amp Line Balancing,2times,Basic approaches for plant layout and line balancing are introduced. Industrial Engineering,2times,After introducing the principles of motion economy, the approaches for process analysis, human-machine analysis, Therblig analysis, standard time setting, etc. are addressed. .1time,					
[Class requirement]					
None					
[Method, Point of view, and Attainment levels of Evaluation]					
The regular examination, in-class examinations and reports are taken into account.					
[Textbook]					
Not used					
[Reference books, etc.]					
(Reference books)					
[Regarding studies out of class (preparation and review)]					
Homework problems are assigned.					
(Others (office hour, etc.))					
The topics covered may be modified from the plan according to the actual schedule.					
*Please visit KULASIS to find out about office hours.					

制御工学 2 (宇) (2)					
[Reference books, etc.]					
(Reference books)					
Introduced during class					
[Regarding studies out of class (preparation and review)]					
We will give a report for each unit. Review is necessary after every lecture.					
(Others (office hour, etc.))					
*Please visit KULASIS to find out about office hours.					

Numbering code					
Course title <English>	結晶物性学 (材工ネ) Physics of Crystal Properties and Imperfections	Affiliated department, Job title,Name	Graduate School of Engineering Professor,INUI HARUYUKI Graduate School of Engineering Associate Professor,KISHIDA KIYOUSUKE		
Target year	3rd year students or above	Number of credits	2	Course offered year/period	2019/First semester
Day/period	Fri.1	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
Dislocations are the most important lattice defects that strongly affect various properties, especially mechanical properties of crystalline materials. In this course, fundamental properties of dislocations as well as basics of elasticity will be lectured.					
[Course Goals]					
This class aims to help students to acquire fundamental understandings of dislocations and also to acquire ways to understand mechanical properties of crystalline materials based on dislocation theory.					
[Course Schedule and Contents]					
(1) Introduction to dislocations [1 week]: (2) Basics of elasticity theory [5 weeks] (3) Elastic properties of dislocations [2 weeks] (4) Motion of dislocations [2 weeks] (5) Force on dislocations [4 weeks] (6) Feedback [1 weeks]					
[Class requirement]					
None					
[Method, Point of view, and Attainment levels of Evaluation]					
Evaluation will be based on one (or two) written examination(s). Attendance and daily reports may be considered in grading determination.					
[Textbook]					
Hand out materials will be provided during the lecture.					
[Reference books, etc.]					
(Reference books)					
鈴木秀次 『転位論入門』 (アグネ) ISBN:4750702315 J.P. Hirth and J. Lothe 『Theory of Dislocations』 (McGraw-Hill) ISBN:TY86299777 J.P. Hirth and J. Lothe 『Theory of Dislocations, 2nd ed.』 (Wiley) ISBN:047109125 幸田成康 『金属物理学序論』 (コロナ) ISBN:9784339042870 柴田俊忍 (ほか)共著 『材料力学の基礎』 (培風館) ISBN:4563034657					
[Regarding studies out of class (preparation and review)]					
To review contents covered in the previous lecture.					
(Others (office hour, etc.))					
*Please visit KULASIS to find out about office hours.					

Numbering code					
Course title <English>	材料物理化学(原) Physical Chemistry of Materials	Affiliated department, Job title,Name	Graduate School of Engineering Professor.TAKAGI IKUJI Graduate School of Engineering Associate Professor.TAISHI KOBAYASHI		
Target year	3rd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.2	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
This course deals with physicochemical information on nuclear energy materials such as production of fuel and soundness of materials, examining their principles and practical examples.					
[Course Goals]					
The goal of the course is to study fission reactors and nuclear fusion reactors in terms of physical chemistry, for instance thermodynamics, reaction velocity, and mass transfer.					
[Course Schedule and Contents]					
(1) Overview of nuclear energy materials, 1 class Provide an overview of nuclear energy materials and the various steps of the nuclear fuel cycle (mining and refinement of nuclear fuel resources, production and burning of nuclear fuel, storage and reprocessing of spent fuel, treatment and disposal of radioactive waste).					
(2) Isotope separation and concentration, 2 classes Explain the principles (gaseous diffusion process, centrifugal separation process) and methods (separative work units, enrichment cascade) of isotopes such as uranium.					
(3) Reaction kinetics, 2 classes Provide an overview of thermodynamics and reaction kinetics and explain order of reaction and rate constant determination methods, along with the influence of temperature.					
(4) Soundness of atomic reactor materials, 2 classes Outline the structure of atomic reactors from the perspectives of materials and cross-sections and explain the influence of radiation injury and corrosion on the soundness of materials, as well as the causes of and strategies for dealing with these phenomena.					
(5) Nuclear fusion reactor fuel and materials, 3 classes Explain the structure of nuclear fusion reactors from the perspectives of materials and cross-sections and explain the production and permeation leakage of the hydrogen isotopes that fuel nuclear fusion reactors, as well as the radioactivation of structural material.					
(6) Materials and radiation, 2 classes Discuss the radiation effect as a problem common to all nuclear energy materials and explain the influence of material properties and radiation.					
(7) Oxides and atomic fuel, 2 classes Explain the behavior of atomic fuel and fission products in reactors using oxygen potential and phase diagrams.					
(8) Confirmation of learning attainment, 1 class Post explanation and review of examination questions to KULASIS.					
Continue to 材料物理化学(原)(2)					

Numbering code					
Course title <English>	材料物理化学(工ネ) Physical Chemistry of Materials	Affiliated department, Job title,Name	Graduate School of Energy Science Professor.HIRATOU TETSUJI		
Target year	3rd year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.2	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
This course discusses physical chemistry in relation to materials and raw materials processing. To do so, lectures focus on thermodynamics, solution chemistry, electrochemistry, the sciences that serve as the basis for material production, functional materials processes, recycling, corrosion and corrosion protection, etc.					
[Course Goals]					
From this course, students will become able to do the following: 1. Thermodynamically estimate aqueous solution reactions (acid-base reaction, oxygen reduction reaction) utilizing the free energy of ion formation. 2. Depict log a-pH diagrams and phase-pH diagrams. 3. Read log a-pH diagrams and phase-pH diagrams. 4. Express simple reaction rate equations in differential and integral form, and determine the reaction rate constant from experiment results. 5. Determine activation energy in relation to reaction rate temperature dependence from an Arrhenius plot. 6. Consider electrode kinetics using the Butler-Volmer equation. 7. Consider corrosion in light of equilibrium theory (Potential-pH diagram). 8. Consider corrosion in light of kinetic theory (Evans diagram, mixed potential model).					
[Course Schedule and Contents]					
Fundamentals of chemical thermodynamics (2 classes) Confirmation is made of the basic items of Gibbs energy, chemical potential and activity, etc., all of which will serve as the foundation for this course.					
Equilibrium theory of aqueous solution reactions (6 classes) Lectures discuss acid-base reactions, oxidation-reduction reactions, and equilibrium electrochemistry, which serve as the foundation for materials processes using aqueous solutions and for corrosion and corrosion prevention.					
Reaction rate fundamentals (3 classes) Explanation is made of chemical reaction rate, dynamic electrochemistry, and solid surface processes, which serve as the foundation for materials processes using aqueous solutions and for corrosion and corrosion prevention.					
Corrosion (3 classes) Lectures will discuss equilibrium theory and kinetics of metal corrosion.					
Feedback class (1 class) Via questions and answer using the study support service (PandA), students will gain a deeper understanding of the contents of this course.					
Continue to 材料物理化学(工ネ)(2)					

材料物理化学(原)(2)	
[Class requirement]	
None	
[Method, Point of view, and Attainment levels of Evaluation]	
[Grading method] Grade is based on one written examination.	
[Grading criterion] Must score 60 or above out of 100 on the written examination 60 or above: pass 59 or below: fail	
[Textbook]	
No additional. Materials will be distributed in class.	
[Reference books, etc.]	
(Reference books) M. Benedict, T. H. Pigford and H. W. Levi 『Nuclear Chemical Engineering, 2nd Ed.』 (McGraw-Hill) ISBN:0070045313 Atkins 『アトキンス物理化学 第10版』 (東京化学同人) ISBN:9784807909087	
[Regarding studies out of class (preparation and review)]	
As needed, practice exercises will be conducted in class, so please review after class.	
(Others (office hour, etc.))	
Lecture is given in Japanese.	
*Please visit KULASIS to find out about office hours.	

材料物理化学(工ネ)(2)	
[Class requirement]	
Students are recommended to have finished the course Energy and Material Thermochemistry I.	
[Method, Point of view, and Attainment levels of Evaluation]	
Grading will be performed in principle using scores on regular tests. Consideration may also be given to exercises, quizzes, and reports assigned in classes.	
[Textbook]	
Materials will be distributed during class or using the student support service (PandA).	
[Reference books, etc.]	
(Reference books) 『アトキンス物理化学』 (東京化学同人)	
[Regarding studies out of class (preparation and review)]	
Notification will be made via the study support service (PandA). For each week 's class, class contents and quiz answers will be posted on the study support service (PandA). Students are requested to review and gain a sufficient understanding of these before each next class period.	
(Others (office hour, etc.))	
Problem-solving type assignments will be designated as necessary using practice exercises as well as the study support service (PandA). Please note also that a portion of course contents may be omitted, or additional content may be added, depending on the progress of the course during each specific academic year.	
*Please visit KULASIS to find out about office hours.	

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Numbering code							
Course title <English>	エレクトロニクス入門 (機宇) 情報 Introduction to Electronics			Affiliated department, Job title,Name	Graduate School of Informatics Professor,MORIKURA MASAHIRO		
Target year	End year students or above	Number of credits	2	Course offered year/period	2019/First semester		
Day/period	Tue.5	Class style	Lecture	Language	Japanese		
[Outline and Purpose of the Course]							
[Course Goals]							
[Course Schedule and Contents]							
.2times, .5times, .2times, .5times, .1time,							
[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		U-ENG25 45995 GJ77					
Course title <English>	特別研究 1 (材) Graduation Thesis1			Affiliated department, Job title,Name	Graduate School of Engineering Professor,SUGIMURA HIROYUKI		
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar	Language	Japanese		
[Outline and Purpose of the Course]							
担当教員の指導のもと、材料科学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 ~ 4 回 研究課題の設定 5 ~ 9 回 先行研究の調査、報告 1 0 ~ 1 2 回 設定課題の新規性、独創性等の検討 1 3 ~ 1 5 回 研究計画の立案							
上記の研究活動を 4 単位分実施するとともに、特別研究報告書の執筆指導などを行う。							
[Class requirement]							
物理工学科材料科学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、出席状況に基づいて行う。							
[Textbook]							
指導教員が個別に指示する教科書等を利用する							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究 1 (機) Graduation Thesis1			Affiliated department, Job title,Name	Graduate School of Engineering Professor,HOUJIYOU MASAKI		
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar	Language	Japanese		
[Outline and Purpose of the Course]							
担当教員の指導のもと、機械工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 ~ 4 回 研究課題の設定 5 ~ 9 回 先行研究の調査、報告 1 0 ~ 1 2 回 設定課題の新規性、独創性等の検討 1 3 ~ 1 5 回 研究計画の立案							
[Class requirement]							
物理工学科機械システム学コースが指定する、入学年次に対応した特別研究着手条件を満たしていること。							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
配属研究室で指定される。							
[Reference books, etc.]							
(Reference books) 木下是雄 『理科系の作文技術』(中央公論新社(新書)) ISBN:9784121006240							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究 1 (工ネ) Graduation Thesis1			Affiliated department, Job title,Name	Graduate School of Energy Science Professor,HAGIWARA RIKI		
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar	Language	Japanese		
[Outline and Purpose of the Course]							
担当教員の指導のもと、エネルギー応用工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 ~ 4 回 研究課題の設定 5 ~ 9 回 先行研究の調査、報告 1 0 ~ 1 2 回 設定課題の新規性、独創性等の検討 1 3 ~ 1 5 回 研究計画の立案							
[Class requirement]							
物理工学科エネルギー応用工学コースが指定する入学年次の特別研究着手条件を満たしていること。							
[Method, Point of view, and Attainment levels of Evaluation]							
一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究1(原) Graduation Thesis1	Affiliated department, Job title,Name	Graduate School of Engineering Professor.YOKOMINE TAKEHIKO				
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、原子核工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1～4回 研究課題の設定 5～9回 先行研究の調査、報告 10～12回 設定課題の新規性、独創性等の検討 13～15回 研究計画の立案							
[Class requirement]							
理工学原子核工学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books) 各指導教員が紹介する							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究1(材) Graduation Thesis1	Affiliated department, Job title,Name	Graduate School of Engineering Professor.SUGIMURA HIROYUKI				
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、材料科学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1～4回 研究課題の設定 5～9回 先行研究の調査、報告 10～12回 設定課題の新規性、独創性等の検討 13～15回 研究計画の立案							
上記の研究活動を4単位分実施するとともに、特別研究報告書の執筆指導などを行う。							
[Class requirement]							
理工学材料科学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、出席状況に基づいて行う。							
[Textbook]							
指導教員が個別に指示する教科書等を利用する							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究1(宇) Graduation Thesis1	Affiliated department, Job title,Name	Graduate School of Engineering Professor.ERIGUCHI KOUJI				
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、航空宇宙工学の関連分野(航空宇宙力学、流体力学、流体数学、推進工学、制御工学、機能構造力学、分子流体力学)に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1～4回 研究課題の設定 5～9回 先行研究の調査、報告 10～12回 設定課題の新規性、独創性等の検討 13～15回 研究計画の立案							
[Class requirement]							
理工学宇宙基礎工学コースが指定する入学年次の特別研究着手条件を満たしていること。							
[Method, Point of view, and Attainment levels of Evaluation]							
一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books) 各担当教員から研究テーマに応じて指示する。							
[Regarding studies out of class (preparation and review)]							
指示された参考書および学術論文等を学期をかけて読み進めること。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>	特別研究1(工ネ) Graduation Thesis1	Affiliated department, Job title,Name	Graduate School of Energy Science Professor.HAGIWARA RIKI				
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、エネルギー応用工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1～4回 研究課題の設定 5～9回 先行研究の調査、報告 10～12回 設定課題の新規性、独創性等の検討 13～15回 研究計画の立案							
[Class requirement]							
理工学エネルギー応用工学コースが指定する入学年次の特別研究着手条件を満たしていること。							
[Method, Point of view, and Attainment levels of Evaluation]							
一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45995 GJ77					
Course title <English>		特別研究1(原) Graduation Thesis1		Affiliated department, Job title,Name		Graduate School of Engineering Professor.YOKOMINE TAKEHIKO	
Target year	4th year students or above	Number of credits	4	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、原子核工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、報告の作成などを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1～4回 研究課題の設定 5～9回 先行研究の調査、報告 10～12回 設定課題の新規性、独創性等の検討 13～15回 研究計画の立案							
[Class requirement]							
理工工学科原子核工学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books) 各指導教員が紹介する							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2(材) Graduation Thesis2		Affiliated department, Job title,Name		Graduate School of Engineering Professor.SUGIMURA HIROYUKI	
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language	Japanese	
[Outline and Purpose of the Course]							
担当教員の指導のもと、材料科学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1回 設定課題の新規性、独創性等の再検証 2～7回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 8～9回 成果のまとめ、中間発表のための資料作成 10回 特別研究中間発表会での発表 11～13回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 14～15回 特別研究報告書の執筆							
上記の研究活動を6単位分実施するとともに、特別研究報告書の執筆指導などを行う。							
[Class requirement]							
理工工学科材料科学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、出席状況、中間発表会における発表内容、特別研究報告書の内容に基づいて行う。							
Continue to 特別研究2(材)(2)							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2(機) Graduation Thesis2		Affiliated department, Job title,Name		Graduate School of Engineering Professor.HOUIIYOU MASAKI	
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language		
[Outline and Purpose of the Course]							
担当教員の指導のもと、機械工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1回 設定課題の新規性、独創性等の再検証 2～10回 実験または理論検討の実施、結果の考察、実験または理論検討の計画の修正などにより研究を遂行 11～13回 成果のまとめ、特別研究報告書の執筆、学術発表会のための資料作成 14回 学術発表会での発表 15回 特別研究報告書の訂正							
[Class requirement]							
理工工学科機械システム学コースが指定する、入学年次に対応する特別研究着手条件を満たしていること。また、特別研究1を履修済みであること。							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、学術発表会における発表内容、特別研究報告書の内容に基づいて行う。							
[Textbook]							
各研究室において指定する。							
[Reference books, etc.]							
(Reference books) 木下是雄『理科系の作文技術』(中央公論新社(新書)) ISBN:9784121006240							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

特別研究2(材)(2)							
[Textbook]							
指導教員が個別に指示する教科書等を利用する							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2 (エネ) Graduation Thesis2		Affiliated department, Job title,Name	Graduate School of Energy Science Professor,HAGIWARA RIKI		
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language		
[Outline and Purpose of the Course]							
担当教員の指導のもと、エネルギー応用工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 回 設定課題の新規性、独自性等の再検証 2 ~ 10 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 1 ~ 1 2 回 成果のまとめ、中間発表のための資料作成 1 3 回 特別研究中間発表会での発表 1 4 ~ 1 5 回 特別研究報告書の執筆							
[Class requirement]							
理工学科学科エネルギー応用工学コースが指定する入学年次の特別研究着手条件を満たしていること。							
[Method, Point of view, and Attainment levels of Evaluation]							
一連の研究活動の実施状況、中間発表会における発表内容、特別研究報告書の内容に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books)							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2 (宇) Graduation Thesis2		Affiliated department, Job title,Name	Graduate School of Engineering Professor,ERIGUCHI KOJI		
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language		
[Outline and Purpose of the Course]							
担当教員の指導のもと、航空宇宙工学の関連分野（航空宇宙力学、流体力学、流体数理学、推進工学、制御工学、機能構造力学、分子流体力学）に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験（シミュレーション含む）と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 回 設定課題の新規性、独自性等の再検証 2 ~ 10 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 1 ~ 1 2 回 成果のまとめ、発表のための資料作成 1 3 回 ~ 1 5 回 特別研究の発表と報告書の執筆							
[Class requirement]							
理工学科学科宇宙基礎工学コースが指定する入学年次の特別研究着手条件を満たし、特別研究1（宇）を修得していること。							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、報告会における発表内容、特別研究報告書の内容に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books)							
各担当教員から研究テーマに応じて指示する。							
[Regarding studies out of class (preparation and review)]							
指示された参考書および学術論文等を学期をかけて読み進めること。							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2 (原) Graduation Thesis2		Affiliated department, Job title,Name	Graduate School of Engineering Professor,YOKOMINE TAKEHIKO		
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, Second semester		
Day/period	Intensive	Class style	Seminar		Language		
[Outline and Purpose of the Course]							
特別研究1の成果を踏まえ、担当教員の指導のもと、原子核工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 回 設定課題の新規性、独自性等の再検証 2 ~ 10 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 1 回 成果のまとめ 1 2 ~ 1 4 回 特別研究報告書の執筆 1 5 回 特別研究報告会での成果発表(ポスター発表)							
[Class requirement]							
理工学科学科原子核工学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、特別研究報告書の内容、特別研究報告会(ポスター発表)における発表内容に基づいて行う。							
[Textbook]							
Not used							
[Reference books, etc.]							
(Reference books)							
Introduced during class							
[Regarding studies out of class (preparation and review)]							
各指導教員の指示に従うこと							
(Others (office hour, etc.))							
*Please visit KULASIS to find out about office hours.							

Numbering code		U-ENG25 45998 GJ77					
Course title <English>		特別研究2 (材) Graduation Thesis2		Affiliated department, Job title,Name	Graduate School of Engineering Professor,SUGIMURA HIROYUKI		
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, First semester		
Day/period	Intensive	Class style	Seminar		Language Japanese		
[Outline and Purpose of the Course]							
担当教員の指導のもと、材料科学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。							
[Course Goals]							
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。							
[Course Schedule and Contents]							
1 回 設定課題の新規性、独自性等の再検証 2 ~ 7 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 8 ~ 9 回 成果のまとめ、中間発表のための資料作成 1 0 回 特別研究中間発表会での発表 1 1 ~ 1 3 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 4 ~ 1 5 回 特別研究報告書の執筆							
上記の研究活動を6単位分実施するとともに、特別研究報告書の執筆指導などを行う。							
[Class requirement]							
理工学科学科材料科学コースが指定する入学年次の特別研究着手条件を満たしていること							
[Method, Point of view, and Attainment levels of Evaluation]							
成績評価は一連の研究活動の実施状況、出席状況、中間発表会における発表内容、特別研究報告書の内容に基づいて行う。							

Continue to 特別研究2 (材) (2)

特別研究 2 (材) (2)	

[Textbook]	
指導教員が個別に指示する教科書等を利用する	
[Reference books, etc.]	
(Reference books)	
[Regarding studies out of class (preparation and review)]	
各指導教員の指示に従うこと	
(Others (office hour, etc.))	
*Please visit KULASIS to find out about office hours.	

Numbering code		U-ENG25 45998 GJ77			
Course title <English>	特別研究 2 (原) Graduation Thesis2			Affiliated department, Job title,Name	Graduate School of Engineering Professor,YOKOMINE TAKEHIKO
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, First semester
Day/period	Intensive	Class style	Seminar	Language	Japanese
[Outline and Purpose of the Course]					
特別研究 1 の成果を踏まえ、担当教員の指導のもと、原子核工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。					
[Course Goals]					
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。					
[Course Schedule and Contents]					
1 回 設定課題の新規性、独創性等の再検証 2 ~ 1 0 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 1 回 成果のまとめ 1 2 ~ 1 4 回 特別研究報告書の執筆 1 5 回 特別研究報告会での成果発表(ポスター発表)					
[Class requirement]					
物理工学科原子核工学コースが指定する入学年次の特別研究着条件を満たしていること					
[Method, Point of view, and Attainment levels of Evaluation]					
成績評価は一連の研究活動の実施状況、特別研究報告書の内容、特別研究報告会(ポスター発表)における発表内容に基づいて行う。					
[Textbook]					
Not used					
[Reference books, etc.]					
(Reference books) Introduced during class					
[Regarding studies out of class (preparation and review)]					
各指導教員の指示に従うこと					
(Others (office hour, etc.))					
*Please visit KULASIS to find out about office hours.					

Numbering code		U-ENG25 45998 GJ77			
Course title <English>	特別研究 2 (エネ) Graduation Thesis2			Affiliated department, Job title,Name	Graduate School of Energy Science Professor,HAGIWARA RIKI
Target year	4th year students or above	Number of credits	6	Course offered year/period	2019/Intensive, First semester
Day/period	Intensive	Class style	Seminar	Language	Japanese
[Outline and Purpose of the Course]					
担当教員の指導のもと、エネルギー応用工学に関する研究課題を設定し、その課題解決のための研究活動を主体的に取り組む。この研究活動を通じて課題解決能力を習得する。得られた成果を関連研究と比較し、その意義や重要性等についてまとめる能力を養う。					
[Course Goals]					
課題設定、関連研究の調査、研究計画の立案、実験と検証を行う。これらの成果を特別研究としてまとめ、発表することを通じて、研究活動について学ぶ。					
[Course Schedule and Contents]					
1 回 設定課題の新規性、独創性等の再検証 2 ~ 1 0 回 実験の実施、結果の考察、実験計画の修正などにより研究を遂行 1 1 ~ 1 2 回 成果のまとめ、中間発表のための資料作成 1 3 回 特別研究中間発表会での発表 1 4 ~ 1 5 回 特別研究報告書の執筆					
[Class requirement]					
物理工学科エネルギー応用工学コースが指定する入学年次の特別研究着条件を満たしていること。					
[Method, Point of view, and Attainment levels of Evaluation]					
一連の研究活動の実施状況、中間発表会における発表内容、特別研究報告書の内容に基づいて行う。					
[Textbook]					
Not used					
[Reference books, etc.]					
(Reference books)					
[Regarding studies out of class (preparation and review)]					
各指導教員の指示に従うこと。					
(Others (office hour, etc.))					
*Please visit KULASIS to find out about office hours.					

Numbering code					
Course title <English>	電気回路基礎論 Fundamentals of Circuit Theory			Affiliated department, Job title,Name	Graduate School of Engineering Associate Professor,HISAKADO TAKASHI
Target year	1st year students or above	Number of credits	2	Course offered year/period	2019/First semester
Day/period	Tue.5	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
The course introduces the fundamentals of the electric circuit. Topics covered include: resistive elements and networks; independent sources; switches and dynamics of first- and second-order networks; phasor analysis; 2-port circuits.					
[Course Goals]					
Students are expected to learn the transient analysis by differential equation and steady state analysis by phasor.					
[Course Schedule and Contents]					
DC circuit,3times,We introduce Kirchhoff#039s current law and Kirchhoff#039s voltage law, Ohm#039s law and independent sources. Differential equation of circuit,5times,We introduce inductors and capacitors and explain the differential equation of circuit. AC circuit,4times,We introduce phasor and explain the steady state analysis. two-port circuit,2times,We extend one-port elements to two-port circuits. academic achievement test,1time,The level of understanding on this lecture will be confirmed.					
[Class requirement]					
None					
[Method, Point of view, and Attainment levels of Evaluation]					
Reports and examinations					
[Textbook]					
奥村浩士 『エース電気回路理論入門』(朝倉書店) ISBN:4254227469					
[Reference books, etc.]					
(Reference books)					
[Regarding studies out of class (preparation and review)]					
After the lesson, solve problems in the text.					
(Others (office hour, etc.))					
*Please visit KULASIS to find out about office hours.					

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Numbering code					
Course title <English>	数值解析 Numerical Analysis	Affiliated department, Job title,Name	Graduate School of Informatics Professor,NISHIMURA NAOSHI		
Target year	End year students or above	Number of credits	2	Course offered year/period	2019/Second semester
Day/period	Wed.3	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
[Course Goals]					
[Course Schedule and Contents]					
.1time, .6times, .3times, .4times, .1time,					
[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.					

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Numbering code					
Course title <English>	数理解析 Analysis in Mathematical Sciences	Affiliated department, Job title,Name	Graduate School of Informatics Professor,NISHIMURA NAOSHI Graduate School of Informatics Associate Professor,YOSHIKAWA HITOSHI		
Target year	4th year students or above	Number of credits	2	Course offered year/period	2019/First semester
Day/period	Thu.4	Class style	Lecture	Language	Japanese
[Outline and Purpose of the Course]					
[Course Goals]					
[Course Schedule and Contents]					
.1time, .5times, .3times, .2times, .1time, .1time, .1time, .1time,					
[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.					