Advanced Lectures on Solid Mechanics (2.0credits) (固体力学特論)

Course Type	Basic Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	Dai OKUMURA Professor	

●Course Purpose

In this course, the fundamentals of nonlinear solid mechanics will be lectured.
The aims of this course:
1. Study tensor analysis
2. Study deformation
3. Study stress and balance principles
4. Study constitutive material models

●Prerequisite Subjects

Mechanics of Materials, Solid mechanics, Continuum mechanics

●Course Topics

1. Tensor analysis, 2. Deformation, 3. Stress, 4. Balance principles, 5. Constitutive material models

Read the part of the textbook before each class. After the class, solve the examples and end-of-chapter problems. Submit reports on request.

●Textbook

Non-linear Elastic Deformations, R.W. Ogden, Dover.

●Additional Reading

Nonlinear Solid Mechanics, G.A. Holzapfel, Wiley.

●Grade Assessment

Overall points are used.

●Notes

NA

●Contacting Faculty

After classes.

Advanced Lectures on Thermal Engineering (2.0credits) (熱工学特論)

Course Type	Basic Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	1 Spring Semester
Lecturer	Hosei NAGANO Professor	

●Course Purpose

-To understand how to utilize knowledge of heat transfer in real world, and think about their purposes (thermal management, serious energy problem, and global warming) -To understand the importance of thermal management.-To understand about trend of research and development for thermal & energy management in engineering field.

●Prerequisite Subjects

Thermodynamics, Heat Transfer Engineering

●Course Topics

Lectures, presentations and discussions on; 1. Fundamentals of heat transfer2. Application of thermodynamics and heat transfer3. Trend of research and development for thermal & energy management in engineering field.

●Textbook

Prints

●Additional Reading

References will be introduced upon on your requests.

●Grade Assessment

Based on reports, presentations, and discussions S(>90), A(>=80), B(>=70), C(>=60), F(<60).

●Notes

This class is conducted in English.

●Contacting Faculty

By e-mail

Advance Lectures on Mathematical Fluid Mechanics (2.0credits) (流体解析特論)

Course Type	Basic Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Yasuhiko SAKAI Professor

●Course Purpose

To learn mathematical principles of viscous fluid mechanics and analysis of various flows. The purpose of achievement: 1. to learn the method of tensor analysis. 2. to understand the meaning of viscous stress tennsor and the way to derive the constitutive eqation. 3. to understand the Navier-Stokes equation and the energy equations. 4. to understand the vorticity equation, the asymptotic form of Navier-Stokes equation, andthe boundary layer theory.

●Prerequisite Subjects

Viscous Fluid Dynamics with Exercises

●Course Topics

1. Tensor analysis, 2. Viscous stress tensor, 3. Navier-Stokes equations and energy equation, 4. Vorticity equation, 5. Navier-Stokes equations in curvilinear coordinate systems, 6. Asymptotic forms of Navier-Stokes equations, 7. Boundary Layer theoryReview after the classes is expected.

●Textbook

Not specified but introduced depending on the themes in the lecture

●Additional Reading

Mathematical Principles of Classical Fluid Mechanics, J. Serrin (in Encyclopedia of Physics, Vol.8-1, Fluid dynamics 1, edited by S. Flugge, Springer Verlag, 1959); Handbook of Fluid Flow Analysis: I. Nakamura (Kyouritsu Shuppan)

●Grade Assessment

Written term examination or term papers: The full mark is 100 points, and the passing mark is 60 points or more.The results for the absentee of the written term examination or the students who do not submit term papers are handled as "absence".Minimum requirement to get the credits is basic understanding of theoretical analysis based on Navier-Stokes equation.

●Notes

Subjects on fluid mechanics at undergraduate level

●Contacting Faculty

We will deal with the questions after evey lecture. Correspondence: ex.4486,ysakai@mech.nagoya-u.ac.jp

Advanced Lectures on Mechanical System Dynamics (2.0credits) (機械力学特論)

Course Type	Basic Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	Tsuyoshi INOUE Professor

●Course Purpose

In this advanced lecture, students will discuss the formulation of a two-dimensional multibody system including constraints. Various numerical integration methods for investigating the dynamic behavior of these systems ar also outlined.

The goal of this lecture is to be able to do the following:
1. Build a planar multibody dynamics model of a mechanical structure
2. Perform numerical analysis of its motion
3. Understand the nature of its motion and predict possible vibration phenomena

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Lectures on Control Engineering (2.0credits) (制御工学特論)

Course Type	Basic Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Shunichi AZUMA Professor

●Course Purpose

Multi-agent systems are systems composed of multiple autonomous systems which interact each other. This course presents modeling techniques and fundamental theory for analysis and control of multi-agent systems.

Students will obtain a basic understanding of the mathematical modeling and design of consensus and coverage control.

●Prerequisite Subjects

Calculus, Linear Algebra, Control Engineering 2 with Exercise, and Dynamic System Control Theory

●Course Topics

1. Overview on multi-agent systems
2. Stability of dynamical systems
3. Algebraic graph theory
4. Consensus control
5. Coverage control

Homework: Review the corresponding part of the textbook.

●Textbook

S. Azuma, M. Nagahara, H. Ishii, N. Hayashi, K. Sakurama, and T. Hatanaka, Control of Multi-agent Systems, Corona Publishing, 2015

●Additional Reading

[1] M. Mesbahi and M. Egerstedt, Graph Theoretic Methods for Multiagent Networks, Princeton University Press, 2010

[2] F. Bullo, J. Cortes, and S. Martinez, Distributed Control of Robotic Networks: A Mathematical Approach to Motion Coordination Algorithms, Princeton University Press, Princeton, 2009

●Grade Assessment

Written examination

●Notes

It is expected that students entering this class will have understanding of the subjects in "Prerequisite Subjects."

●Contacting Faculty

Advanced Lectures on Machine Information Processing (2.0credits) (機械情報処理特論)

Course Type	Basic Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Tatsuya SUZUKI Professor

●Course Purpose

This lecture provides the technologies on Bayesian inference, which can be a basis to make a bridge between mechanical systems and ICT (Information and Communication Technology). Relations between the Bayesian inference and other traditional signal processing techniques, such as Kalman filter and Hidden Markov Model, are also explained. In addition, continuous/discrete hybrid dynamical systems are introduced together with their typical applications.After taking this course, the students are expected to have abilities on:Understanding of fundamental probabilistic theoryUnderstanding of Bayesian inference and its applicationUnderstanding of Bayesian network and its applicationUnderstanding of dynamic Bayesian network and Bayesian filterUnderstanding of Kalman filter and its applicationUnderstanding of Hidden Markov model and its applicationUnderstanding of Hybrid dynamical systems

●Prerequisite Subjects

Information processing, Control engineering

●Course Topics

This course is organized as follows:1.Basis on probability theory2.Bayesian inference3.Bayesian network4.Dynamic Bayesian network5.Bayesian filter6.Kalman filter7.Hidden Markov model8.Hybrid dynamical systemRead carefully the lecture notes before attending each class. After each class, solving the exercises in the lecture notes is highly recommended. Submission of the reports after some class is mandatory.

●Textbook

Original lecture notes will be provided.

●Additional Reading

It will be announced in the class.

●Grade Assessment

Evaluation is based on the written examination and written report. You need more than mark of 60 out of 100 points. If the fundamental topics are successfully understood, credit will be awarded. Higher grade will be provided depending on the level of understood topics.

●Notes

Nothing particular.

●Contacting Faculty

After each class you can ask in person.Otherwise, contact to: Pro. Suzuki Ext. 2700, t_suzuki@nuem.nagoya-u.ac.jp

Seminar on Solid Mechanics 1A (2.0credits) (固体力学セミナー1A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the journal papers and textbooks on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of presentations (70 %) and question-and-answers (30 %) in the seminar course.

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 1B (2.0credits) (固体力学セミナー1B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the journal papers and textbooks on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of presentations (70 %) and question-and-answers (30 %) in the seminar course.

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 1C (2.0credits) (固体力学セミナー1C)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the journal papers and textbooks on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of presentations (70 %) and question-and-answers (30 %) in the seminar course.

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 1D (2.0credits) (固体力学セミナー1D)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the journal papers and textbooks on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of presentations (70 %) and question-and-answers (30 %) in the seminar course.

●Notes

●Contacting Faculty

Seminar on Energy and Environmental Engineering 1A (2.0credits) (環境・エネルギー工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. fundamental characteristics of combustion phenomena, and 2. combustion reaction kinetics and their analyses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 1B (2.0credits) (環境・エネルギー工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. fundamental characteristics of combustion phenomena, and 2. combustion reaction kinetics and their analyses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 1C (2.0credits) (環境・エネルギー工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. fundamental characteristics of combustion phenomena, and 2. combustion reaction kinetics and their analyses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 1D (2.0credits) (環境・エネルギー工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Statistical Fluid Engineering 1A (2.0credits) (統計流体工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose

Read a textbook and references necessary for the research of turbulent phenomena, and learn the theoretical and computational research techniques on the basis of functional space theory. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. the fundamental characteristics of turbulence, 2. the spectral theory, the tensor analysis, and the probability and statistical theory including derivation of various statistical quantities, and 3. the methods and techniques for turbulent numerical simulations.

●Prerequisite Subjects

Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Enginneering

●Course Topics

1. Fundamental characteristics of turbulence, 2. Spatial-temporal velocity correlation, spectrum and probability distribution, 3. Analysis of the universality, coherent structures, fine scale structures of turbulence, 4. Method of computational fluid mechanics.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook

The textbook is selected at the beginning of the term. The suitable references are also selected according to the progress of the seminar. The printed materials are distributed at need.

●Additional Reading

Turbulent Phenomena: I. Nakamura (Asakura)

●Grade Assessment

Achievement is judged on the basis of the level of the oral presentation and discussions at the seminar, and the term reports. The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. Students who do not submit the term reports are handled as "absence."

●Notes

Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty

During the class.

Seminar on Statistical Fluid Engineering 1B (2.0credits) (統計流体工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
Read a textbook and references necessary for the research of turbulent phenomena, and learn the theoretical and computational research techniques on the basis of functional space theory. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. the fundamental characteristics of turbulence, 2. the spectral theory, the tensor analysis, and the probability and statistical theory including derivation of various statistical quantities, and 3. the methods and techniques for turbulent numerical simulations.

●Prerequisite Subjects
Advanced Lecutures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A

●Course Topics
1. continued from Seminar on Statistical Fluid Engineering 1A, 2. reading and explaining the literature on turbulence in turn

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
distributing the printed materials at need

●Additional Reading
Turbulent flow phenomena : I.Nakamura (Asakura)

●Grade Assessment
Achievement is judged on the basis of the level of the oral presentation and discussions at the seminar, and the term reports. The full mark is 100 points and the passing mark is 60 points or more.The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty
During the class.

Seminar on Statistical Fluid Engineering 1C (2.0credits) (統計流体工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose

Read a textbook and references necessary for the research of turbulent phenomena, and learn the theoretical and computational research techniques on the basis of functional space theory. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. the fundamental characteristics of turbulence, 2. the spectral theory, the tensor analysis, and the probability and statistical theory including derivation of various statistical quantities, and 3. the methods and techniques for turbulent numerical simulations.

●Prerequisite Subjects

Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A, 1B.

●Course Topics

1. continued from Seminar on Statistical Fluid Engineering 1A,1B., 2. reading and explaining the textboook or literature on turbulence in turn

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook

The textbook is selected at the beginning of the term. The suitable literatures are also selected according to the progress of the seminar.The printed materials are distributed at need.

●Additional Reading

Turbulent phenomena: I. Nakamura (Asakura)

●Grade Assessment

Achievement is judged on the basis of the level of the oral presentation and discussions at the seminar, and the term reports. The full mark is 100 points and the passing mark is 60 points or more.The result of the student who does not submit the term reports is handled as "absence".

●Notes

Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty

Discussions will be made at the time of seminar.

Seminar on Statistical Fluid Engineering 1D (2.0credits) (統計流体工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
Read a textbook and references necessary for the research of turbulent phenomena, and learn the theoretical and computational research techniques on the basis of functional space theory. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is to fully understand 1. the fundamental characteristics of turbulence, 2. the spectral theory, the tensor analysis, and the probability and statistical theory including derivation of various statistical quantities, and 3. the methods and techniques for turbulent numerical simulations.

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Mechanics, Seminar on Statistical Fluid Engineering 1A, 1B, 1C

●Course Topics
1. continued from Seminar on Statistical Fluid Engineering 1A, 1B, 1C, 2. reading and explaining the textbook or literature on turbulence in turn.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
The textbook is selected at the beginning of the term. The suitable literatures are also selected according to the progress of the seminar.The printed materials are distributed at need.

●Additional Reading
Turbulent phenomena: I. Nakamura (Asakura)

●Grade Assessment
Achievement is judged on the basis of the oral presentation and the level of discussions at the seminar, and the term reports. The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty
Discussions will be made at the time of seminar.

Seminar on Thermal Control Engineering 1A (2.0credits) (熱制御工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn fundamentals of heat transfer and combustion engineering

●Prerequisite Subjects
Thermodynamics, Heat Transfer, Fluid Mechanics, Thermal Energy and Environmental Systems

●Course Topics
Reading and explaining textbook;
Combustion Physics; by C. K. Law (Subject to change)

●Textbook
Combustion Physics; by C. K. Law (Cambridge University Press)

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge University Press)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes
No

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 1B (2.0credits) (熱制御工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn fundamentals of heat transfer and combustion engineering

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering
Seminar on Heat Transfer and Combustion Engineering 1A

●Course Topics
Continued from Seminar on Heat Transfer and Combustion Engineering 1A

●Textbook
Combustion Physics; by C. K. Law (Cambridge University Press)

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge University Press)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes
/No requirements

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 1C (2.0credits) (熱制御工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn fundamentals of heat transfer and combustion engineering

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1A,
Seminar on Heat Transfer and Combustion Engineering 1B

●Course Topics
Continued from Seminar on Heat Transfer and Combustion Engineering 1B

●Textbook
Combustion Physics; by C. K. Law (Cambridge University Press)

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge University Press)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 1D (2.0credits) (熱制御工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn fundamentals of heat transfer and combustion engineering

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1A, 1B, 1C

●Course Topics
Continued from Seminar on Heat Transfer and Combustion Engineering 1C

●Textbook
Combustion Physics; by C. K. Law (Cambridge University Press)

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge University Press)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Biomechanics 1A (2.0credits) (バイオメカニクスセミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Strength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 1B (2.0credits) (バイオメカニクスセミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 1AStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 1C (2.0credits) (バイオメカニクスセミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 1ASeminar on Biomechanics 1BStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 1D (2.0credits) (バイオメカニクスセミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 1ASeminar on Biomechanics 1BSeminar on Biomechanics 1CStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Computational Mechanics 1A (2.0credits) (計算力学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 1A, the students are going to understand the background and basics of numerical analysis theory. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:

1. Derivation of mathematical model from the corresponding physical model
2. Understanding various numerical methods for the corresponding mathematical models
3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity

●Course Topics

1. Various partial differential equations
2. Boundary value and initial boundary value problem
3. Finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 1B (2.0credits) (計算力学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 1B, the students are going to understand the background and basics of numerical analysis theory following the seminar 1A. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:

1. Derivation of mathematical model from the corresponding physical model
2. Understanding various numerical methods for the corresponding mathematical models
3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity

●Course Topics

1. Various partial differential equations
2. Boundary value and initial boundary value problem
3. Theory of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the standard theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 1C (2.0credits) (計算力学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

This seminar aims at acquiring basic skills of numerical methods using computers.

In the Computational Mechanics Seminar 1C, the students are going to understand the advanced numerical analysis theory. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:

1. Derivation of mathematical model from the corresponding physical model
2. Understanding various numerical methods for the corresponding mathematical models
3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity

●Course Topics

1. Various partial differential equations
2. Boundary value and initial boundary value problem
3. Theory of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the advanced theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 1D (2.0credits) (計算力学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 1D, following the seminar 1C, the students are going to understand the advanced numerical analysis theory. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:1. Derivation of mathematical model from the corresponding physical model2. Understanding various numerical methods for the corresponding mathematical models3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity

●Course Topics

1. Various partial differential equations 2. Boundary value and initial boundary value problem3. Theory of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the advanced theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Mechanical System Dynamics 1A (2.0credits) (機械力学セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

This seminar aims to develop applied skills from basic skills related to mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis). Students will learn concepts, theoretical and experimental techniques through research presentation and discussions.

The goal of this seminar is to be able to:
Plan and execute a total processes from the modeling of dynamic systems to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 1B (2.0credits) (機械力学セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

This seminar aims to develop applied skills from basic skills related to mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis). Students will learn concepts, theoretical and experimental techniques through research presentation and discussions.

The goal of this seminar is to be able to:
Plan and execute a total processes from the modeling of dynamic systems to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 1C (2.0credits) (機械力学セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

This seminar aims to develop applied skills from basic skills related to mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis). Students will learn concepts, theoretical and experimental techniques through research presentation and discussions.

The goal of this seminar is to be able to:
Plan and execute a total processes from the modeling of dynamic systems to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 1D (2.0credits) (機械力学セミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

This seminar aims to develop applied skills from basic skills related to mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis). Students will learn concepts, theoretical and experimental techniques through research presentation and discussions.

The goal of this seminar is to be able to:
Plan and execute a total processes from the modeling of dynamic systems to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Assistive Robotics 1A (2.0credits) (支援ロボティクスセミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further make them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall/a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

Compulsory subjects for mechanical students including control theory, mechanics, and mechanical dynamics.

●Contacting Faculty

Any time by e-mail or direct contact to professors.

Seminar on Assistive Robotics 1B (2.0credits) (支援ロボティクスセミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the course of exercises, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 1C (2.0credits) (支援ロボティクスセミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 1D (2.0credits) (支援ロボティクスセミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Vehicle Safety Engineering 1A (2.0credits) (自動車安全工学セミナー1A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

The field of continuum mechanics that is studied from a mechanical viewpoint is continuum mechanics. In this seminar, continuum mechanics is studied systematically and understand how to express strain and stress for large deformation.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety Engineering 1B (2.0credits) (自動車安全工学セミナー1B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

The field of continuum mechanics that is studied from a mechanical viewpoint is continuum mechanics. In this seminar, continuum mechanics is studied systematically and understand how to express strain and stress for large deformation.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety Engineering 1C (2.0credits) (自動車安全工学セミナー1C)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Vehicle crash mechanics is lerned systematically based on mechanics and dynamics by reading a English textbooks.The objective of this seminar is as follows:1. Understand vehicle crash from kinematics and dynamics and apply them to complex problems.2. Understand occupant protection from the dynamics and apply it to real problems.3. Understand the body structure and mechanism related to vehicle crash and apply to complex problems.

●Prerequisite Subjects

Automotive engineering

●Course Topics

1. Vehicle impact modes and crash data recording2. Digital filtering practice per sae j211 and iso 64873. Basic kinematic relationships4. Impact and excitation5. Vehicle and occupant kinematics in fixed object impact6. Kinematic variables7. Restraint coupling8. Occupant ridedown analysis and energy management

●Textbook

Vehicle Crash Mechanics, Matthew Huang, CRC Press

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety Engineering 1D (2.0credits) (自動車安全工学セミナー1D)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Following the Automotive Safety Engineering Seminar 1D, the vehicle crash mechanics is lerned by systematically based on mechanics and dynamics by reading a English textbooks.The objective of this seminar is as follows:1. Understand vehicle crash from kinematics and dynamics and apply them to complex problems.2. Understand occupant protection from the dynamics and apply it to real problems.3. Understand the body structure and mechanism related to vehicle crash and apply to complex problems.

●Prerequisite Subjects

Automotive engineering

●Course Topics

1. Crash pulse characterization2. Crash pulse prediction by convolution method3. Basecs of impact and excitation modeling4. Response prediction by numerical method5. Impulse, modementum and energy6. Crash severity and reconstruction

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No requirements

●Contacting Faculty

Seminar on Mathematical System Control 1A (2.0credits) (システム制御セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 1B (2.0credits) (システム制御セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 1C (2.0credits) (システム制御セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 1D (2.0credits) (システム制御セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomechanical Control 1A (2.0credits) (生体システム制御セミナー1A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

We study and master theories and methodologies about system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

There is nothing because this starts in the first semester.

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 1B (2.0credits) (生体システム制御セミナー1B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following the Seminars on Biomechanical control 1A, we study and master theories and methodologies about system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Seminar on Biomechanical control 1A

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminar.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 1C (2.0credits) (生体システム制御セミナー1C)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 1A and 1B, we study and master theories and methodologies about system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Biomechanical control 1A and 1B

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminar.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 1D (2.0credits) (生体システム制御セミナー1D)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 1A, 1B and 1C, we study and master theories and methodologies about system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Biomechanical control 1A, 1B and 1C

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminar.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Mobility System 1A (2.0credits) (モビリティシステムセミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 1B (2.0credits) (モビリティシステムセミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 1C (2.0credits) (モビリティシステムセミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 1D (2.0credits) (モビリティシステムセミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for one semester and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for two semesters and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Advanced Lectures on Mechanical Systems Engineering 1 (1.0credits) (機械システム工学特論第１)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Part-time Faculty

●Course Purpose

The aim is to gain a wide range of insights into mechanical systems engineering.
Achievement goals
1. Take lectures by instructors who are close to their own specialty, and deepen your specialty.
2. A wide range of knowledge on mechanical systems can be obtained from lectures that differ from their own specialties.

●Prerequisite Subjects

Confirm the specialty of the facilitator lab

●Course Topics

A relay lecture given by external lecturers (multiple) in the field of mechanical systems engineering.

●Textbook

Distribute handouts.

●Additional Reading

Refer to handouts

●Grade Assessment

Credits are awarded for meeting the specified criteria (attendance, report).

●Notes

No requirement

●Contacting Faculty

After class

Advanced Lectures on Mechanical Systems Engineering 2 (1.0credits) (機械システム工学特論第２)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Part-time Faculty

●Course Purpose

The aim is to gain a wide range of insights into mechanical systems engineering.
Achievement goals
1. Take lectures by instructors who are close to their own specialty, and deepen your specialty.
2. A wide range of knowledge on mechanical systems can be obtained from lectures that differ from their own specialties.

●Prerequisite Subjects

Confirm the specialty of the facilitator lab

●Course Topics

A relay lecture given by external lecturers (multiple) in the field of mechanical systems engineering.

●Textbook

Distribute handouts.

●Additional Reading

Refer to handouts

●Grade Assessment

Credits are awarded for meeting the specified criteria (attendance, report).

●Notes

No requirement

●Contacting Faculty

After class

Advanced lecture on Energy and Environmental Engineering (2.0credits) (環境・エネルギー工学特論)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Mechanical Systems Engineering		
Starts 1	Autumn Semester ,every other year		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

To learn the fundamental knowledge of various energy conversion systems and technologies for energy saving and environmental protections. :Achievement purpose:1.to understand the basis of thermodynamics, and be able to make the calculation connected with them:2.to understand the principle of various energy conversion systems like combustion and gasification.:3.to understand the principle of global environmental problems, and be able to estimate the contribution of energy conversion systems to the global environment, using thermodynamic quantities such as exergy analyses.:

●Prerequisite Subjects

Thermodynamics, Heat transfer, Energy conversion engineering

●Course Topics

1.Material and energy resources:2.Local and global environmental problems:3.Combustion sciences:4.The principle of energy conversion systems:5.Environmetal protection technologies:6.Environment-friendly technologies for high-temperature energy conversion:

●Textbook

Handouts (as occasion demands)

●Additional Reading

The White Paper on Energy

●Grade Assessment

Grades will be based on class participation and reports.
50% for interim report
50% for final report

●Notes

None

●Contacting Faculty

Send your questions by E-mail.

Statistical Fluid Engineering (2.0credits) (統計流体工学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Yasumasa ITO Associate Professor

●Course Purpose

(Purpose)Learn fundamentals of fluid mechanics including basic turbulence theory for incompressible flows. Learn measurement technique and numerical simulations for turbulent flows.(Goal) Become able to design and carry out fluid engineering research for the given purpose.

●Prerequisite Subjects

Fundamentals of Fluid Mechanics with Exercises 1 (or equivalent)Fundamentals of Fluid Mechanics with Exercises 2 (or equivalent)Inviscid Fluid Mechanics (or equivalent) Viscous Fluid Mechanics (or equivalent)

●Course Topics

This lecture will be given in English. (The language will be determined at the first class.)Part 1: Fundamentals of Fluid Mechanics*Basic equations*Solutions of N-S equations*Flow around an object*Raleigh’s problem *Boundary layer (BL) theory*Karman’s momentum equation*Flow rate and momentum in jetsPart 2: Transition of flow –laminar to turbulence*Instability*Turbulence statistics*Reynolds stress*Energy transfer in turbulence (cascade down)*Length scales and Kolmogorov’s law*Scalar (heat and mass) transport*Lagrangian theory for turbulent mixingPart 3: Design of Research in Fluid Engineering*Flow similarity (model experiments)*Numerical simulations* Laboratory experiments@Students are supposed to print and check the slides as pre-study. Reports will be assigned occasionally. Quizzes will be asked during the class.

●Textbook

Lecture notes are provided through NUCT.

●Additional Reading

Turbulence by P. Davidson (Oxford University Press) First Course in Turbulence (MIT Press)Ryutai Rikigaku (Introduction to Fluid Mechanics) by Mikio Hino (Asakura Shoten) (in Japanese)Ranryu Rikigaku (Turbulence Dynamics) by S. Kida and S. Yanase (Asakura Shoten) (in Japanese)

●Grade Assessment

*Final exam, reports, oral presentations, and quizzes during the lectures*Attendance is not accounted. *Qualifying score: 60/100 S: 10090A:8980, B:7970C:6960F:59 or belowMinimum requirement for earning the credits for the students whounderstand the basic words and strategy for fluid engineering research.

●Notes

At least can briefly explain the following words.(laminar, turbulence) (equation of continuity, Navier-Stokes equation) (boundary layer) (diffusion, convection) (Reynolds number) (momentum, energy) (shear stress)(viscosity, kinematic viscosity)

●Contacting Faculty

Available anytime. Ex.: 4488Email: yito@nagoya-u.jp

Advanced Lectures on Combustion Engineering (2.0credits) (燃焼工学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Ryo YOSHIIE Associate Professor

●Course Purpose

To learn fundamental reaction behaviors and diagnostics of heterogeneous combustion, with resulting hazardous emissions, and air pollution controls; Achievement purpose: to understand fundamentals of various combustion technologies and current industrially related issues.

●Prerequisite Subjects

Thermodynamics, Heat transfer, Energy conversion engineering

●Course Topics

1. Spray combustion: 2. Solid combustion: 3. Combustion diagnostics: 4. Emissions: 5. Pollution controls:

●Textbook

Handouts in PDF format (as occasion demands)

●Additional Reading

Materials will be introduced in the class as needed.

●Grade Assessment

Exercises and reports:

●Notes

No other specific requirements

●Contacting Faculty

Students may ask questions during and after the class via E-mail.E-mail: ryo.yoshiie@mae.(Add nagoya-u.ac.jp)

Reactive Fluid Mechanics (2.0credits) (反応性流体力学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	"YAMAMOTO Kazuhiro" Associate Professor

●Course Purpose

This lecture is concerned with chemically reacting flow, including thermodynamics, fluid mechanics, and chemical reactions.
One related topic is selected and introduced.

Objectives:
1. Provide chemically reacting flow around current themes of research within the recent topic and news
2. Provide relevant introductory talks on applying to engineering regards to higher level
3. Provide public speaking and outreach training for early career researchers and PhD students
4. Provide opportunities be made aware of other relevant research field

●Prerequisite Subjects

Computer Software I, Fluid Mechanics,Heat Transfer, Thermal Energy and Environmental Systems, Advanced Lecture on Combustion Engineering

●Course Topics

1. Conservation equations for chemically reacting flow
2. Combustion field and flame
3. Turbulent combustion
4. Soot, NOx
5. Fire
6. Numerical simulation
7. Cellular Automata
8. Lattice Boltzmann method
9. Other research topic

Before the lecture, read the next contents introduced by the text. After the lecture, submit report related with every topic.

●Textbook

Reference and research paper presented at lecture

●Additional Reading

Combustion Fundamentals written by R. A. Strehlow, Mc Graw Hill (for higher professional level)

●Grade Assessment

Scores are 10090 points for S, 8980 points for A, 7970 points for B, 6960 points for Cunder 59 points for F, by reports

●Notes

No conditions given.

●Contacting Faculty

All answers will be given for questions.

Advanced Lectures on Biomaterials (2.0credits) (バイオマテリアル特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Eijiro MAEDA Associate Professor

●Course Purpose

This class focuses on two highly-interested research topics in life science: 1) mechanobiology and 2) tissue engineering and regenerative medicine. Mechanobiology is to investigate how physical forces play roles in the regulation of events in the life across multiple scales, whereas Tissue engineering and regenerative medicine is an interdisciplinary field across medicine, material science and biology with an ultimate goal to regenerate the parts of our body when they are injured or diseased. Through the course, students are supposed to acquire the skills 1) to understand the basic concept of these research fields, 2) to explain the latest topics of the fields and 3) to be able to read the latest research papers.

●Prerequisite Subjects

Strength of materials, continuum mechanics, fluid mechanics(not required but related subjects) biomechanics, cell biology

●Course Topics

1. Foundation of mechanobiology2. Research survey of mechanobiology 13. Research survey of mechanobiology 24. Foundation of tissue engineering and regenerative medicine5. Research survey of issue engineering and regenerative medicine 16. Research survey of issue engineering and regenerative medicine 2Students are supposed to conduct literature survey, the preparation for presentation outside the course hours.

●Textbook

Handouts will be provided.

●Additional Reading

Mechanobiology, Masahiro Sokabe, Kagakudojindo (Japanese)Seitai zairyogaku, Nihon Kikaigakkai, Ohm sha (Japanese)Introduction to Cell Mechanics and Mechanobiology, C.R. JacobsGarland Science

●Grade Assessment

Grade will be evaluated based on the attendance, the quality of presentations and the participation to the discussion as well as the understanding of the topics covered in the course.

●Notes

Expected to have interests in biomaterials and biomechanics

●Contacting Faculty

Please email e.maeda@nagoya-u.jp for any inquiry and making appointment if necessary.

Advanced Lectures on Biomechanics (2.0credits) (バイオメカニクス特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	Takeo MATSUMOTO Professor

●Course Purpose

To study biomechanics, especially on its application to cell biology. After studying the structure and mechanical properties of animal cells, we focus on the mechanical response of cells to physical environment, and discuss engineering application of cells.

●Prerequisite Subjects

Strength of MaterialsFluid mechanicsSeminar on Biomechanics 1A

●Course Topics

In each class, a student explain an assigned chapter of the textbook after reading it and studying it extensively and deeply by referring the reference books. Other students deepen their understanding on the subject through discussion following the explanation by the assigned student. The assigned student also needs to make complete translation of the assigned chapter to Japanese as a report. We will study especially on: 1. Cell movements under microscope 2. Actin cortex 3. Contraction of muscle 4. Microtubule 5. Flagella and cilia 6. Integration of cell movements

●Textbook

Dennis Bray: Cell Movements, Garland Publishing, Inc.

●Additional Reading

Cell Biomechanics, Ohm-shaMolecular Biology of the Cell, 6th Edition, Garland Science

●Grade Assessment

Attendance to the class and discussion and the quality of the presentation and the report will be comprehensively evaluated.

●Notes

Not in particular.

●Contacting Faculty

Students can ask questions at the end of each class.E-mail: takeo@mech.nagoya-u.ac.jp

Advanced Computational Mechanics (2.0credits) (数値解析特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Toshiro MATSUMOTO Professor

●Course Purpose

The finite element method (FEM) is widely used in various engineering problems, and the students study the advanced physical modelling of the phenomena, constructing the corresponding mathematical models, advanced computational algorithms of FEM, and how to develop the computer code. The lecture is based on the handouts and the students are going to cope with the assignments for formulating FEM and example numerical demonstrations.By finishing this class, the students are targeted to have the capability of doing the following skills:1. Developing the advanced physical model2. Developing the advanced mathematical model corresponding to the above derived physical model3. Formulation of the multi-dimensional finite element method4. Developing and using a finite element code

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Elasticity

●Course Topics

1. Vector, tensor, index notation 2. Formula of integration by parts3. Cauchy’s formula and stress tensor4. Balance of force and moment, derivation of equilibrium equation and symmetry of stress tensor5. Strain tensor6. Generalized Hooke’s law7. Navier’s equation8. Virtual work principle9. Weighted-residual form and weak form10. Discretization of weak form and introduction of shape functions11. Expression of weight-function (virtual displacement) with shape function12. Derivation of stiffness matrix and equivalent nodal force vector by means of element integration13. Computation algorithm of finite element method14. Numerical examples through actual finite element code

●Textbook

Handouts are delivered and other documents are put on Web and downloaded.

●Additional Reading

Not used.

●Grade Assessment

The understanding of the theory and computation algorithm of FEM is evaluated through assignments and achievement test. Students can pass when the basic formulation of the weak-form of finite element method and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate the finite element method for more complicated problem and can develop a finite element computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the class or during office hours.

Advanced Lectures on Computational Physics (2.0credits) (計算物理学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Toru TAKAHASHI Associate Professor

●Course Purpose

It has been a long time since numerical simulations became an important element that supports science and engineering. Such numerical simulations have been investigated intensively in the field of computational physics, computational engineering, computational mechanics, and numerical analysis. This course focuses on the boundary element method (BEM) in view of the numerical methods to solve the (initial-)boundary value problems (IBVPs). Nowadays, the BEM has been recognized again as the useful numerical solution method for linear BVPs because of the recent progresses on the acceleration and high-precision techniques. After reviewing the mathematical basics and doing their exercises, students will learn the fundamentals of the BEM. Afterward, the fast multipole method, which is one of fast algorithms to accelerate the calculation of the BEM, is explained together with the recent research topics regarding the method.

●Prerequisite Subjects

Undergraduate mathmatics (calculus, linear algebra, vector analysis, complex analysis, Fourier analysis, etc.) is required but reviewed appropriately in the course.

●Course Topics

1. Review and exercise of the mathematics related to BEM
2. Fundamentals of BEM
3. Fast multipole method

●Textbook

Some textbooks will be introduced according to the contents at a given time.

●Additional Reading

As well as textbooks, the references (books or papers) will be mentioned in the course.

●Grade Assessment

Students will be evaluated by the response to the questions during the course (about 10% of all), marks of homework and exercises (about 40%), and the final exam (report or writing test; about 50%).

●Notes

There is no restriction.

●Contacting Faculty

Lunch time after each class.

Advanced Lectures on System Modelling (2.0credits) (システムモデリング特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	mitei

●Course Purpose

Aiming at learning methodology of systems approach and its practical applications, methods for modeling of dynamical system are introduced. As the practical examples, estimation problems using the least squares, system identification in the frequency domain will be presented during the lecture.

●Prerequisite Subjects

Dynamic System Theory, Control Engineering, Mathematics I and II, Signal Processing, Dynamics, Electric Circuit Engineering

●Course Topics

1. Overview: methods of modeling dynamical systems
2. Representations of systems
3. Fundamentals of the least squares method
4. System identification in the frequency domain
5. System identification in the time domain

Read a textbook, handouts, and your notebook before and after a lecture. Reports will be also given.

●Textbook

Handouts will be propvided in the lecture or on the web page.

●Additional Reading

L. Ljung and T. Glad, Modeling of Dynamic Systems, Prentice Hall
M. Suzuki et al., Dynamical System Theory (in Japnanese), Corona Publishing Co.,Ltd.
S. Adachi, Fundamentals of System Identification (in Japnanese), Tokyo Denki Univ. Press.

●Grade Assessment

Written examination and written report. More than 60 out of 100 points is required. It is necessary to understand models for dynamical systems, least squares method, and basics of frequency domain system identification.

●Notes

It is better to prefer control engineering.

●Contacting Faculty

Questions are welcomed during or after the lecture.

Advanced Lectures on System Safety (2.0credits) (システム安全特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Yoji YAMADA Professor

●Course Purpose

Securing safety of mechanical systems can be achieved through the life cycle of the targeted system by risk assessment followed by risk reduction measures based upon the assessment results. The objective of the special lecture is to learn mathematical /logical tools indispensable when conducting risk assessment processes, which is developed by provision of quantity analysis of the risk, a reflection of the concept of function safety for risk reduction.

●Prerequisite Subjects

Probability and statistics basis of which will be explained in the class.

●Course Topics

1. Understanding risk assessment process in the field of safety of machinery with Gaussion probability
2. Failure and repair rates
3. Failure - repair life cycle with Markov process modelling
4. FTA and prime implicant

●Textbook

Printed materials will be handed out when necessary.

●Additional Reading

Printed materials will be handed out occasionally.
For reference,
1)Tim Gedford, Roger Cooke: Probabilistic Risk Analysis: Foundations and Methods, Cambridge University Press, 2001, ISBN 0-521-77320-2
2)Hiromitsu Kumamoto, E. J. Henley: Probablistic Risk Assessment and Management for Engineers and Scientists, IEEE Press, 1996, ISBN 0-780-31004-7
3)Hisaji Shimizu, Takafumi Fukuda: Mechanical Safety Engineering - Basic Theory and International Standard, Yokendo Co., Ltd., 2006, ISBN4-8425-9914-6

●Grade Assessment

Evaluation for grade: homework assignments and positive attitude - 60%, final exam - 40%

●Notes

Bases of probability and statistics will be introduced wherever necessary.
Homework is assigned through NUCT after the 2nd class is over.
Interpretation of product liability and safety standards from legal viewpoints as well as current topics on safety of machinery will also be introduced in the class.

●Contacting Faculty

Prof. Yamada will welcome and handle questions in the class.
Contact him after the class at yamada-yoji@mech.nagoya-u.ac.jp.

Advanced Lectures on Nonlinear Control (2.0credits) (非線形制御特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Toru ASAI Associate Professor

●Course Purpose

Through this course, students will understand the basic knowledge and the basic design techniques on nonlinear control systems which can be often seen in mechanical systems. Specifically,
1. Students can model nonlinear systems based on nonlinear state equation.
2. Students understand the concepts of the various stability notions for nonlinear sytems.
3. Students can apply some basic control system design methods for nonlinear system.

●Prerequisite Subjects

Control Engineering 1, Control Engineering 1, Linear Algebra I, II, Calculus I, II, Mathematics I and Tutorial

●Course Topics

The topics are as follows:
1. Modeling of nonlinear systems based on nonlinear state equations
2. Solutions of nonlinear systems
3. Lyapunov stability concepts for nonlinear systems
4. Input-output stability
5. Small gain and passivity theorems
6. Control design methods for nonlinear systems

Homework is assigned several times, where calculations ans simulations are required.

●Textbook

none

●Additional Reading

Hassan K. Khalil, Nonlinear Systems

●Grade Assessment

Grades are evaluated based on the intermediate and final reports. All the reports must be submitted and those evaluations are required to be above C grade.

●Notes

There is no specific requirement for registration. However, to understand this course, knowledge on classical and modern control system theory is necessary.

●Contacting Faculty

by E-mail

Advanced Lectures on System Dynamics (2.0credits) (システムダイナミックス特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Mechanical Systems Engineering	Automotive Engineering
Starts 1	Spring Semester ,every other year	1 Spring Semester
Lecturer	ShogoOKAMOTO Associate Professor	

●Course Purpose

Substantial difficulties of dynamic systems in the real world lie in the involvement of a large number of related factors that deviate statistically. Multivariate analyses and statistics are common tools for understanding and modeling these intricate systems. This course is arranged for those who had few opportunities to study statistics, multivariate analyses, and some basis for these mathematics. We learn intermediate topics of classic multivariate analyses and related statistics. We also practice how to apply each method of multivariate analysis on real data and interpret the results throughout the course.

●Prerequisite Subjects

Mathematics, especially, linear algebra and statistics of undergraduate level.

●Course Topics

1-2 h: Introduction. Multivariate regression analysis
3 h: Outlier analysis
4-5 h: Principal component analysis
6 h: Factor analysis
7 h: Discriminative analysis: k-means method and linear discriminative analysis
8-9 h: Structural equation modeling (Covariance structure analysis)
10-11 h: Graphical modeling using partial correlation coefficients (Covariance selection)
12-15 h: Final presentation from students

●Textbook

Available on the course website http://www.mech.nagoya-u.ac.jp/asi/ja/lecture/okamoto_system.html

●Additional Reading

Provided on site.

●Grade Assessment

Three reports (60%) and one presentation (40%) are collectively evaluated. All or randomly selected students have to prepare for the final presentation, on which real world data is examined with one of the analysis methods. Course grading will follow the standard rule: S, A, B, C, and F for those who acquire 100%-90%, 89%-80%, 79-65%, 64%-60%, and less than 59%.

●Notes

NA

●Contacting Faculty

Any time by e-mails or direct visits.

Advanced Lectures on Human System Engineering (2.0credits) (ヒューマンシステム工学特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Injury biomechanics is a field that deals with human injury during impact. In this lecture, injuries to human body and their prevention in vehicle collisions are provided. The goal of this lecture is to understand analytical methods of impact for human body based on dynamics, biomechanics, material mechanics.
After the lectures, following things will be learned:
1. Understand the mathematical expressions of impact and response, and apply them to human and automotive dynamics.
2. Understand mathematical models (rigid body model, multibody model, finite element model).
3. Understand the anatomy of each part of the human body, the mechanism of injury, and injury prevention

●Prerequisite Subjects

Biomechanics, Automotive engineering

●Course Topics

1. Impact biomechanics
2. Crash dummy
3. Structural deformation
4. Frontal impact
5. Occupant protection
6. Side impact
7. Compatibility
8. Pedestrian protection
9. Child occupant protection
10. Accident reconstruction
11. Whiplash injury

●Textbook

●Additional Reading

●Grade Assessment

Reports

●Notes

●Contacting Faculty

Advanced Lectures on Mathematical Programming (2.0credits) (数理計画法特論)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Convexity plays an important role in nonlinear programming and systems theory. In this lecture, we first introduce convex sets, convex functions and their properties, and then we talk about convex optimization and its application to systems theory.

Achievement target
1. Understanding the basic theories and properties of convex sets and functions
2. Understanding some optimality conditions in mathematical programming problems
3. Understanding the basic duality theory

●Prerequisite Subjects

basic real analysis and linear algebra

●Course Topics

1. Mathematical Background for Optimization Problems
2. Convex sets and functions
3. Optimality conditions and their applications
4. Basic Duality theories and their applications

Solve some problems left as exercise in the lecture

●Textbook

Introducing some textbooks in the lecture if necessary

●Additional Reading

S. Boyd and L. Vandenberghe, 'Convex Optimization,' Cambridge, 2004
J.-B. Hiriart-Urruty, C. Lemarechal 'Convex analysis and minimization algorithms I,II' Springer-Verlag 1991

●Grade Assessment

Report(50%) + Examination(50%)

●Notes

nothing required

●Contacting Faculty

For general lectures, contactProf. Taji.If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Exercises in Solid Mechanics A (1.0credits) (固体力学特別実験及び演習A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, make research presentations on solid mechanics and discuss it to obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Solid Mechanics B (1.0credits) (固体力学特別実験及び演習B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, make research presentations on solid mechanics and discuss it to obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Energy and Environmental Engineering A (1.0credits) (環境・エネルギー工学特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Learn fundamental methods to analyze physicochemical properties, calorific values, stoichiometric air for various solid fuels utilized as sustainable energy resources.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Exercises in Energy and Environmental Engineering B (1.0credits) (環境・エネルギー工学特別実験及び演習B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Learn fundamental methods to analyze physicochemical properties, calorific values, stoichiometric air for various solid fuels utilized as sustainable energy resources.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Exercises in Statistical Fluid Engineering A (1.0credits) (統計流体工学特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose

Through investigation of the past studies related to the given research theme and individual research presentations, students are expected to cultivate the understanding of fluid dynamics phenomena. The goal of this course is to have students acquire the basic skills and knowledge as an engineering researcher.

●Prerequisite Subjects

Advanced Lectures on Statistical Fluid Engineering, Advanced Lectures on Mathematical Fluid Mechanics.

●Course Topics

Two to five students present their research progress. Q and A session and discussion are followed. Each student present once a month. Students are highly encouraged to conduct researches during off-class hours intensively.

●Textbook

No specific textbook is given but appropriate textbooks related to their research themes must be chosen and referred by the students

●Additional Reading

Similar to the textbook, journal papers are also considered as important literature

●Grade Assessment

Performance is evaluated by the presentation and discussion in the class. The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum progress of the research. Students who are absent more than three times are handled as "absence".

●Notes

Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty

During the class.

Exercises in Statistical Fluid Engineering B (1.0credits) (統計流体工学特別実験及び演習B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
Through investigation of the past studies related to the given research theme and individual research presentations, students are expected to cultivate the understanding of fluid dynamics phenomena. The goal of this course is to have students acquire the basic skills and knowledge as an engineering researcher.

●Prerequisite Subjects
Advanced Lectures on Statistical Fluid Engineering, Advanced Lectures on Mathematical Fluid Mechanics, Exercises in Statistical Fluid Engineering A

●Course Topics
As well as Exercises in Statistical Fluid Engineering A, two to five students present their research progress. Q and A session and discussion are followed. Each student present once a month. Students are highly encouraged to conduct researches during off-class hours intensively.

●Textbook
No specific textbook is given but appropriate textbooks related to their research themes must be chosen and referred by the students

●Additional Reading
Similar to the textbook, journal papers are also considered as important literature

●Grade Assessment
Performance is evauated by the presentation and discussion in the class. The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum progress of the research. Students who are absent more than three times are handled as "absence".

●Notes
Subjects related to fluid dynamics at undergraduate level

●Contacting Faculty
During the class.

Exercises in Thermal Control Engineering A (1.0credits) (熱制御工学特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
A seminar style, in which respective students have to report what they are doing in their research program

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Exercises in Thermal Control Engineering B (1.0credits) (熱制御工学特別実験及び演習B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
Continued from Exercises in Heat Transfer and Combustion Engineering A

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
Report or Oral Examination
Report: 50%, Oral Examination: 50%

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Exercises in Biomechanics A (1.0credits) (バイオメカニクス特別実験及び演習A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This exercise is aimed to facilitate the understanding of research project of each participant through the progress presentation and discussion. Students are supposed to participate actively in the exercise.

●Prerequisite Subjects

Biomechanics

●Course Topics

In this exercise, students are supposed to research progress presentations and discussion on biomechanics related to tissues and cells.Students are supposed to conduct research experiments and literature survey outside the course hours as planned at the beginning of the course.

●Textbook

Handouts delivered in each class

●Additional Reading

Introduced in each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Prepare well for the exercise.

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Exercises in Biomechanics B (1.0credits) (バイオメカニクス特別実験及び演習B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose
This exercise is aimed to facilitate the understanding of research project of each participant through the progress presentation and discussion. Students are supposed to participate actively in the exercise.

●Prerequisite Subjects
Exercises in Biomechanics A

●Course Topics
In this exercise, students are supposed to research progress presentations and discussion on biomechanics related to tissues and cells.

Students are supposed to conduct research experiments and literature survey outside the course hours as planned at the beginning of the course.

●Textbook
Handouts delivered in each class

●Additional Reading
Introduced in each class

●Grade Assessment
Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes
Prepare well for the exercise.

●Contacting Faculty
Students can ask questions at the end of each seminar.
E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Exercises in Computational Mechanics A (1.0credits) (計算力学特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Advanced Experiments in Computational Mechanics A, the students are going to understand the advanced formulation of finite element methods and boundary element methods. The seminar is based on the lab work and the students are going to give presentations for given topics. By finishing this experiment, the students are targeted to have the capability of doing the following skills:1. Understanding of advanced formulation of finite element methods and boundary element methods2. Understanding advanced computation algorithms of finite element methods and boundary element methods3. Practice of numerical analyses for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Formulations of finite element methods for various partial differential equations 2. Formulations of boundary element methods for various partial differential equations 3. Development of computation algorithms of finite element methods for various partial differential equations 4. Development of computation algorithms of boundary element methods for various partial differential equations5. Application of finite element method and boundary element method to optimization problems

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the advanced theory and computation algorithm of numerical methods is evaluated through exercises and presentations. Students can pass when the advance theory of finite element methods and finite element methods, and their corresponding computational algorithms are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

●Contacting Faculty

Break after the seminar or during office hours

Exercises in Computational Mechanics B (1.0credits) (計算力学特別実験及び演習B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Advanced Experiments in Computational Mechanics A, the students are going to understand the advanced formulation of finite element methods and boundary element methods following the Advanced Experiments A. The seminar is based on the lab work and the students are going to give presentations for given topics. By finishing this experiment, the students are targeted to have the capability of doing the following skills:1. Understanding of advanced formulation of finite element methods and boundary element methods2. Understanding advanced computation algorithms of finite element methods and boundary element methods3. Practice of numerical analyses for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Formulations of finite element methods for various partial differential equations 2. Formulations of boundary element methods for various partial differential equations 3. Development of computation algorithms of finite element methods for various partial differential equations 4. Development of computation algorithms of boundary element methods for various partial differential equations5. Application of finite element method and boundary element method to optimization problems

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the advanced theory and computation algorithm of numerical methods is evaluated through exercises and presentations. Students can pass when the advance theory of finite element methods and finite element methods, and their corresponding computational algorithms are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Exercises in Mechanical System Dynamics A (1.0credits) (機械力学特別実験及び演習A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this experiment and exercises, students learn practical total skills in the field on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis) through experiments and exercises.

The goal of this experiment and exercise is to be able to:
Perform various experimental methods related to mechanical systems.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Mechanical System Dynamics B (1.0credits) (機械力学特別実験及び演習B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this experiment and exercises, students learn practical total skills in the field on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, and diagnosis) through experiments and exercises.

The goal of this experiment and exercise is to be able to:
Perform various experimental methods related to mechanical systems.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Assistive Robotics A (1.0credits) (支援ロボティクス特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Practice		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the course of exercises, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Beginning with the experimental design on the presenter's subject, the quality of completeness of the experiment as well as the analysis, discussion and report are evaluated.

●Notes

●Contacting Faculty

Exercises in Assistive Robotics B (1.0credits) (支援ロボティクス特別実験及び演習B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Practice		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the course of exercises, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Beginning with the experimental design on the presenter's subject, the quality of completeness of the experiment as well as the analysis, discussion and report are evaluated.

●Notes

●Contacting Faculty

Exercises in Vehicle Safety A (1.0credits) (自動車安全工学特別実験及び演習A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

The field of continuum mechanics that is studied from a mechanical viewpoint is continuum mechanics. In this exercise, continuum mechanics will be practiced to deepen the understanding of how to express strain and stress for large deformation.The objective of this course is to be able to:1. Understand the equibilium equations and plinciple of virtual work and apply them to specific problems.2. Understand stress tensors and apply them to specific problems.3. Understand the constitutive equations and apply them to specific problems.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Vehicle Safety B (1.0credits) (自動車安全工学特別実験及び演習B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

The field of continuum mechanics that is studied from a mechanical viewpoint is continuum mechanics. In this exercise, continuum mechanics will be practiced to deepen the understanding of how to express strain and stress for large deformation.The objective of this course is to be able to:1. Understand the equibilium equations and plinciple of virtual work and apply them to specific problems.2. Understand stress tensors and apply them to specific problems.3. Understand the constitutive equations and apply them to specific problems.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Mathematical System Control A (1.0credits) (システム制御特別実験及び演習A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to develop basic knowledge for understanding systems and control through reading academic books in turn. Students will obtain the mathematical knowledge and presentation skills.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Mathematical System Control B (1.0credits) (システム制御特別実験及び演習B　)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to develop basic knowledge for understanding systems and control through reading academic books in turn. Students will obtain the mathematical knowledge and presentation skills.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Exercises in Biomechanical Control A (1.0credits) (生体システム制御特別実験及び演習A)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

We study and understand the basic theory of data structures and algorithms for optimization, system modeling and learning algorithms and their application to computer programming.

Achievement target
1. Understanding basic theories of data structures and algorithms
2. Learning basic programming methods

●Prerequisite Subjects

There is nothing because this starts in the first semester.

●Course Topics

Text reading and programming exercises.

Read the relevant part in the textbook before each class, and solve the problems in the textbook.

●Textbook

Introduction to computation and programming using Python 2nd. ed. 2016 MIT press

●Additional Reading

Introducing some textbooks in the lecture if necessary

●Grade Assessment

Reports (50%) and oral presentation (50%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Exercises in Biomechanical Control B (1.0credits) (生体システム制御特別実験及び演習B)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Experiment and Exercise
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose
Following the Exercises in Biomechanical Control A we study and understand the advanced basic theory of data structures and algorithms for optimization, system
modeling and learning algorithms and their application to computer programming.

●Prerequisite Subjects
Following the Exercises in Biomechanical Control A

●Course Topics
Text reading and programming exercises.

Read the relevant part in the textbook before each class, and solve the problems in the textbook.

●Textbook
Introduction to computation and programming using Python 2nd. ed. 2016 MIT press

●Additional Reading
Introducing some textbooks in the lecture if necessary

●Grade Assessment
Reports (50%) and oral presentation (50%). The pass line is 60%.

●Notes
nothing required

●Contacting Faculty
For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Exercises in Mobility System A (1.0credits) (モビリティシステム特別実験及び演習A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

A trainee tackles a research issue related to mobility system, and study to improve the problem-solving skills by learning how to get the knowledges and the technical methodologies in this lecture. A tackled issue is selected under the supervision of the teachers, and a trainee do a research schedule planning, survey, construction of an experimental system, data measurement and analysis, evaluation and discussion related to the issue. A trainee also learns the presentation skills to appeal a contribution and an achievement of the research and how to answer the questions.
A trainee will be expected to have the following knowledge and abilities when the lecture is finished:
1. Can explain needs and contribution of the research associating with the social demands and previous researches.
2. Can make a research plan, schedule, and do management to achieve the research goal by the end the semester.
3. Can carry out the measurement, making a hypothesis, data analysis and construction of experimental system to solve the social problem, and the evaluation of the proposal methodologies to appeal the merits.
4. Can explain the steps 1-3 by writing simple and understandable manuscripts or presentation, and can reply appropriately for the question from the audience.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Dynamic System Control Theory, Robotics, Signal Processing, Statistics and Analysis

●Course Topics

1.A research theme related to the mobility system field is selected under the supervision of the teachers to solve the social problems.
2.Previous researches related to the selected research theme are surveyed and problems are found. A hypothesis and an approach are proposed to solve the found problem.
3.An experiment for the measurement and data analysis to confirm the hypothesis are planned and a project management of the research is learned to achieve the research goal. A new approach to solve the social problem standing on the hypothesis is proposed and related theory and techniques are learned.
4.A trainee learns how to prepare and give the presentation and/or to write a paper to explain and appeal the contribution and the achievement of the research with simple and understandable expression.
A trainee have to prepare the slides and/or the documents before the next presentation and discussion in the lecture regarding the survey, data measurement, data analysis, construction of the experimental system, and the evaluation related to the research theme.

●Textbook

A text book is introduced regarding the selected research theme.

●Additional Reading

A reference book and articles are introduced regarding the selected research theme.

●Grade Assessment

The trainee has a presentation to introduce the background, goal and hypothesis of the research, and explain the used theory and/or methodologies. The presentation, Q/A, and discussions are evaluated their understanding, interpretability. Also the activeness and project management skill are evaluated from the progress report and discussion in every lecture.

The trainee who understood and explained the social problem, needs, the remaining issues and used theory and methodologies, and had an active discussion is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted not only in the discussion in lecture but in other time by using e-mail and face-to-face meeting with appointment.

Exercises in Mobility System B (1.0credits) (モビリティシステム特別実験及び演習B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

A trainee tackles a research issue related to mobility system, and study to improve the problem-solving skills by learning how to get the knowledges and the technical methodologies in this lecture. A tackled issue is selected under the supervision of the teachers, and a trainee do a research schedule planning, survey, construction of an experimental system, data measurement and analysis, evaluation and discussion related to the issue. A trainee also learns the presentation skills to appeal a contribution and an achievement of the research and how to answer the questions.
A trainee will be expected to have the following knowledge and abilities when the lecture is finished:
1. Can explain needs and contribution of the research associating with the social demands and previous researches.
2. Can make a research plan, schedule, and do management to achieve the research goal by the end the semester.
3. Can carry out the measurement, making a hypothesis, data analysis and construction of experimental system to solve the social problem, and the evaluation of the proposal methodologies to appeal the merits.
4. Can explain the steps 1-3 by writing simple and understandable manuscripts or presentation, and can reply appropriately for the question from the audience.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Dynamic System Control Theory, Robotics, Signal Processing, Statistics and Analysis

●Course Topics

1. A research theme related to the mobility system field is selected under the supervision of the teachers to solve the social problems.
2. Previous researches related to the selected research theme are surveyed and problems are found. A hypothesis and an approach are proposed to solve the found problem.
3. An experiment for the measurement and data analysis to confirm the hypothesis are planned and a project management of the research is learned to achieve the research goal. A new approach to solve the social problem standing on the hypothesis is proposed and related theory and techniques are learned.
4. A trainee learns how to prepare and give the presentation and/or to write a paper to explain and appeal the contribution and the achievement of the research with simple and understandable expression.
A trainee have to prepare the slides and/or the documents before the next presentation and discussion in the lecture regarding the survey, data measurement, data analysis, construction of the experimental system, and the evaluation related to the research theme.

●Textbook

A text book is introduced regarding the selected research theme.

●Additional Reading

A reference book and articles are introduced regarding the selected research theme.

●Grade Assessment

The trainee has a presentation to introduce the background, goal and hypothesis of the research, and explain the used theory and/or methodologies. The presentation, Q/A, and discussions are evaluated their understanding, interpretability. Also the activeness and project management skill are evaluated from the progress report and discussion in every lecture.

The trainee who understood and explained the social problem, needs, the remaining issues and used theory and methodologies, and had an active discussion is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted not only in the discussion in lecture but in other time by using e-mail and face-to-face meeting with appointment.

Innovation Practice Course (4.0credits) (イノベーション体験プロジェクト)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Under the instruction of the company engineer (DP, Directing Professor), I carry out the project for the problem solution by the team of several people consisting of different specialisms. In this way, it is intended to let you sense ability for problem discovery, the importance of the general intellectual power of compound eyes on the basis of real world bodily.
I know a point of view, the plan as the company and perform a discussion, exchange of opinions between the different specialty and aim for the breeding of the viewpoint general, to see engineering by examining it as the problem solution person concerned from different angles.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

I organize different specialty, the team (several/team) consisting of the students of the department several sets, and DP is the instruction in each each team. Based on the project theme that DP determined, I set the problem that a student carries out concretely. For 75 hours (principle one day a week), I accomplish the project for the problem solution.
Prior lecture to affect a project theme by the DP
Setting (opinion, information exchange, allied investigation, examination, discussion) of the concrete problem by the student
Enforcement of the problem solution project
Summary, report of the result

I assume this a main component.
In addition, I may be given an investigation and the consideration in conjunction with the theme as a problem from DP. Report it in a date (the next time lectures) when it was appointed, and announce it; and a thing corresponding to the exchange of opinions in the team.

●Textbook

documents that a lecturer (DP) introduces it and shows.

●Additional Reading

documents that a lecturer (DP) introduces it and shows.

●Grade Assessment

I evaluate it through accomplishment, the discussion of the project, result announcement. If a consideration power, the adjustability for the problem solution, the expansion of the field of vision are accepted, it is said that I pass.

●Notes

There are no prerequisites

●Contacting Faculty

A lecturer (DP) and this project staff of the university accept questions at any time.

Research Internship１ U2 (2.0credits) (研究インターンシップ１ U2)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook
documents that the staff instructing the training in the company introduces it and shows

●Additional Reading
documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment
I am given in the following on 20th in the total days that engaged in the training in the company.
I do that I announce the result to the university in a result briefing session to perform after the training if essential.
I evaluate it based on result announcement contents and an evaluation book of the training staff making. I recognize an experience-based effect in the training by oneself, and will to plan reflection to a study, the study at the university does it with a pass if admitted.

●Notes
The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty
The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U3 (3.0credits) (研究インターンシップ１ U3)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days between 21 and 40 days in the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U4 (4.0credits) (研究インターンシップ１ U4)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook
documents that the staff instructing the training in the company introduces it and shows

●Additional Reading
documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment
The credits will be given to the students who have had the working days between 41 and 60 days in the internship company.

●Notes
The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty
The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U6 (6.0credits) (研究インターンシップ１ U6)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

It is strongly recommended to take the industry-university joint educational courses such as Focus on Venture Business and ,etc.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days between 61 and 80 days in the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Research Internship１ U8 (8.0credits) (研究インターンシップ１ U8)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Through the training to affect technology development, the study of the company in the company is advanced, and experience the challenge to a practical problem. In this way, it is aimed for upbringing of human resources tying engineering to creation of the social value.
It is wider in a technique and a study, and a consciousness, ability to catch in a general viewpoint (utility, economy) and communication power is bred and aims for what is reflected by a study, the study at the university.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

In the company accepting an intern, I make the training (study) about the study theme that a company shows.
Orientation to affect the overall company concerned and the training medium
Enforcement (including cooperation, the adjustment with the company staff) of the training theme
Summary, report of the training result
I assume a report (presentation) of the training result to the university a main component.
As the associated document, documents investigation may not support during the working hours that a company sets, I do the attendance of the lecture about "the handling, a point to keep in mind by basic knowledge and the study internship of intellectual property rights" to need what I study in the training overtime by oneself, and to perform on the university side prior to the company training again with

requisiteness.

●Textbook

documents that the staff instructing the training in the company introduces it and shows

●Additional Reading

documents that the staff instructing the training in the company introduces it and shows

●Grade Assessment

The credits will be given to the students who have had the working days more than or equal to 81 daysin the internship company.

●Notes

The studnt that I subscribed for the training theme of the company, and acceptance was accepted.

●Contacting Faculty

The training staff of the company and the study internship staff of the university accept questions at any time.

Advanced Lectures on Frontier Technologies and Sciences (1.0credits) (最先端理工学特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

To research in advanced engineering, it is necessary to learn the latest research trends through practice. Through symposium-style academic discussions, students will be able to study cutting-edge science and engineering research and discuss the latest trends in the subject areas.

●Prerequisite Subjects

Knowledge of the subject areas.

●Course Topics

Participated in special lectures set every year from the fields of biochemistry, analysis, semiconductors, polymers, and startups related to cutting-edge science and engineering, and participated in a symposium where research presentations on cutting-edge engineering were presented. By participating, students will study cutting-edge science and engineering research and discuss the latest trends in the subject areas. After taking the course, study and study the relevant field in detail.

●Textbook

Distribute as appropriate.

●Additional Reading

Distribute as appropriate.

●Grade Assessment

Report. A score of 60 or more out of 100 will be passed. Pass if you have a broad understanding of the subject area. Highly appreciate the point of contact with your own research, new business and research

proposals.

●Notes

There are no special requirements. Students who are interested in startups are preferred.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Experiment		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

To research in advanced engineering, it is necessary to learn the latest research trends through practice. The purpose of this experiment is to find the research issues on one's own and conduct research experiments using the latest experimental equipment and molecular simulation technology.
Through this experiment, you will be able to understand the principles of the Raman spectrometer, ionization potential measurement, X-ray diffraction etc. and molecular simulation software and learn how to use them practically. The goal is to comprehensively acquire the knowledge, skills, and presentation techniques related to advanced experiments necessary for conducting the research that was the subject.

●Prerequisite Subjects

it is advisable to acquire basic knowledge on the subject research.

●Course Topics

When students choose the prepared subject, students perform the curriculum using one of a Raman spectrometer, an ionization potential measurement and an X-ray diffractometer and learn the principles and practical and advanced usage of these equipment. In the case of an experiment proposed by students (original experiment), students proposes a molecular simulation experiment or research using the above-described equipment, and conduct the experiment with the instructor to produce results. Ultimately, students discuss the results, present their results, and learn how to use the advanced equipment and simulation skills.

●Textbook

Distribute as needed. Please check the required documents by yourself.

●Additional Reading

Distribute as needed. Please check the required documents by yourself.

●Grade Assessment

Exercise (50%) and presentation of research results (50%) will be evaluated. Understanding the measurement principle and usage is used as a criterion for acceptance, but the research achievements and new approaches to research are highly evaluated. A score of 60 or more out of 100 is a passing score.

●Notes

No course requirements.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Introduction to Academic Communication (1.0credits) (コミュニケーション学)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Graduate Chemistry
	Graduate Chemistry	Automotive Engineering	Automotive Engineering
	Civil and Environmental Engineering Graduate		
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester		
Lecturer	ReikoFURUYA Associate Professor		

●Course Purpose

Students will learn presentation skills for academic purposes, which may include giving academic presentations.
Japanese students are expected to present in English and international students in Japanese in the seventh or eighth class meeting.
By taking this class, students are expected to be able to do the following:
-Give a solid presentation with confidence and without hesitance
-Grasp the characteristics of successful presentations
-Use techniques learned in class in their own presentation

●Prerequisite Subjects

English language classes for Japanese students
Japanese language classes for international students

●Course Topics

(1) Ways to convey messages in presentation
(2) The language of a presentation
(3) Tips for making effective slides
(4) Observation and analysis of video-taped presentation by a past student
(5) Paper vs presentation
(6) Preparation for individual presentation
(7) Individual presentations I

(8) Individual presentations

This course requires students to work outside of the classes for individual presentation.

●Textbook

Handouts will be distributed in class

●Additional Reading

1The Japan Times
2:

●Grade Assessment

Individual presentation: 50%
Active class participation: 50%

Grades: A+: 100%-95%, A: 94%-80%, B: 79%-70%, C: 69%-65%, C-: 64%-60%, F: 59%-0%

Grading will be decided based on the ability to give an effective academic presentation.

●Notes

There are no requirements for taking this class.

●Contacting Faculty

Questions will be answered before class, in class, after class or by e-mail.

Latest Advanced Technology and Tasks in Automobile Engineering (3.0credits) (先端自動車工学特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester		
Lecturer	Yukio ISHIDA Designated Professor		

●Course Purpose

This course is intended to study the latest advanced technology of automobile engineering from top researchers of universities and industries. The topics of lectures are related to almost all fields of automotive industries, such as hibrid cars, electric cars, automated driving and crash safety. It is asle intended to develop the English hearing/speaking ability. The attainment targets are as follows:

1. Understand the latest technology of automotive engineering.
2. Underatand company's automotive production system.
3. Improve English ability in the field of socience and engineering.
4. Strengthen communication skills and presentation skills in English by studying with international students.

●Prerequisite Subjects

lectures related to fundamental physics, mechanical, electrical and information engineering.

●Course Topics

A. Lectures

1. The Car Industry, Market Trend, Circumstance and Its Future.
2. Overview of Automotive Development Process.
3. Observation and Evaluation of Drivers' Behavior Perspective.
4. Car Materials and Processing.
5. Movements and Control of a Car.
6. Safety Engineering for the Prevention of Accidents.
7. Crash Safety.
8. Automobile Embedded Computing System.
9. Wireless Technologies in ITS.

10.Applications of CAE to Vehicle Development.
11.Energy Saving Technology for Automobiles.
12.Automated Driving.
13.Traffic Flow Characteristics.
14.Cars and Roads in Urban Transportation Context.
15.Automobile in Aging Society.
B. Factory Visits
1.Toyota Motors Corp., 2. Mitsubishi Motors Corp., 3. Toyota Boshoku Corp., 4.Suzuki Museum,
5.Toyota Commemorative Museum, 6. Traffic Safety and Environmental Lab.
C. Group Research Project
Several students form one group and each group selects one topic. They investigate and discuss about this topic and make presentations.
After each lecture is finished, read the handout and write a repor about each lecture with your comments.

●Textbook
Handout delivered in each lecture

●Additional Reading
Introduced in the lectures

●Grade Assessment
Evaluation will be based on (a) Discussions in the lectures 20%, (b) report for each lecture 20%, (c) group presentation 30%. and (d) report on research subject 30%. It is necessary to attend factory visits.In each item, the undastanding of the concepts is especially evaluated.
Summing up the all scores from (a) to (d) and the students with evaluation A, B, or C can pass this subject.

●Notes
1. There are limits of enrollment capacity. Full course student limit is about 10. Auditor limit for each lecture is about 10.
2. English ability is checked before accepted as a student.

●Contacting Faculty
Mainly accepted during each lecture. Other general questions are accepted by Professor Yukio Ishida.
<Contact> TEL: 052-747-6797, Email: ishida@nuem.nagoya-u.ac.jp

Advanced Lectures on Scientific English (1.0credits) (科学技術英語特論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	Automotive Engineering
	Automotive Engineering	Civil and Environmental Engineering Graduate	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Part-time Faculty		

●Course Purpose

This is a course to acquire basic skills to summarize research as a paper in English. By the end of the course, students will be able to …
explain the basic structure of science and technology research paper
list essential components of each section of research paper
type short multiple-paragraph essays with appropriate punctuation
orally express logically structured opinion

●Prerequisite Subjects

Various subjects relating to English

●Course Topics

1. Basics of academic writing in English (1)
2. Basic structure of science & technology research paper (1)
3. Writing (1), feedback and opinion exchange
4. Basics of academic writing in English (2)
5. Basic structure of science & technology research paper (2)
6. Writing (2), feedback and opinion exchange
7. Basic structure of science & technology research paper (3)
8. Writing (3), feedback and opinion exchange

Students are expected to spend a few hours each week reviewing key points of the lecture and working on the writing assignment.

●Textbook

None. Students will receive handouts in each class session.

●Additional Reading

Glasman-Deal, H. (2010). Science Research Writing For Non-Native Speakers of English. Imperial College Press.
Swales, J.M. & Feak, C.B. (2012). Academic Writing for Graduate Students. The University of Michigan Press.
Wallwork, A. (2013). English for Academic Research: Grammar, Usage and Style. Springer.
Wallwork, A. (2016). English for Writing Research Papers. Springer.

●Grade Assessment

Submitting three short writing assignments that show understanding of research paper structure with appropriate punctuation is required for a passing grade. Speaking English contributing to discussion and opinion exchange, as well as raising questions in class, is strongly encouraged.

●Notes

There are no prerequisites

●Contacting Faculty

Email address to be announced in the first class

Focus on Venture Business I (2.0credits) (ベンチャービジネス特論 I)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

People often point out that the layer of startup companies should assume the leading edge is thin. Part of the cause depends on the system, but in many cases, it is due to the difference in perceptions of the entrepreneurship between East and Western researchers. In this course, you study the basic knowledge and goals required as engineers and researchers when commercializing/starting a “university research.” We will show examples of technology development and commercialization based on research results of universities, entrepreneurship in companies and venture startups, and consider venture business utilizing research. Through this lecture, entrepreneurs' mindsets will be formed as well as minimum knowledge of patents.

●Prerequisite Subjects

●Course Topics

●Textbook

Distribute materials as appropriate.

●Additional Reading

●Grade Assessment

Evaluate based on self-made problem report Understanding the problems and solutions for startups that respond to the problems in the lecture is a criterion for success. The contents of the report are comprehensively evaluated, and a score of 60 or more is considered acceptable. New business proposals will be appreciated.

●Notes

Do not have any special requirements. We hope students who are interested in startups.

●Contacting Faculty

the break after the lecture.

Focus on Venture Business II (2.0credits) (ベンチャービジネス特論II)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor	Akitoshi EDAGAWA Visiting Professor	

●Course Purpose

By referring to the examples of commercialization, in-company entrepreneurship and venture entrepreneurship given in the special lecture on venture business I, you study the specialized knowledge necessary for entrepreneurship and start-up from a public accountant, SME consultant, etc. Talks are held with specialists in Japan to acquire the knowledge needed for venture business management.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Internship A (1.0credits) (学外実習Ａ)

Course Type	Comprehensive engineering courses
Division at course	Master's Course
Class Format	Practice
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose
Experience detection and solution processes for practical problems in industry, and learn how to integrate their own fundamental skills.

●Prerequisite Subjects
Fundamentals of engineering and mechanics

●Course Topics
Assignments are set as appropriate in consultation with the training destination.

●Textbook
confirm to training destination

●Additional Reading
confirm to training destination

●Grade Assessment
Evaluation from the training destination; Presentation; Reports

●Notes
No requirement

●Contacting Faculty
Appropriately

Internship B (1.0credits) (学外実習Ｂ)

Course Type	Comprehensive engineering courses
Division at course	Master's Course
Class Format	Practice
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose
Experience detection and solution processes for practical problems in industry, and learn how to integrate their own fundamental skills.

●Prerequisite Subjects
Fundamentals of engineering and mechanics

●Course Topics
Assignments are set as appropriate in consultation with the training destination.

●Textbook
confirm to training destination

●Additional Reading
confirm to training destination

●Grade Assessment
Evaluation from the training destination; Presentation; Reports

●Notes
No requirement

●Contacting Faculty
Appropriately

Seminar on medical engineering (2.0credits) (医工連携セミナー)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Materials Process Engineering	Chemical Systems Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	Associated Faculty		

●Course Purpose

In the coming decades with growing overage population, novel technologies and outstanding ideas for the new breakthrough strategy of tailor-made medical therapy is strongly required. For the establishment of such strategy, basic technologies that enable the detection and diagnosis of molecular dynamics should be investigated. In this class, we try to educate young researchers to step out to this new frontier by setting various types of classes held by very advanced researchers in medical engineering field in Nagoya University. The lecturers are invited from engineering faculty and medical faculty, and introduce the expected ideas and the most recent achievements in the aspect of medical engineering.

1. Explain the importance of medical engineering research
2. Explain the outline of medical engineering research in Nagoya University
3. Explain the potential engineering ability needed for committing in medical engineering field

●Prerequisite Subjects

Clinical medicine, Molecular biology, Biological engineering, Biomechanics, Robotics, Medical engineering, Bioinformatics

●Course Topics

In every lecture, different lectures invited from different fields (engineer, doctors, etc.) teach the most recent advances in the field of medical engineering.

The following viewpoint will be focused

1. Propose the engineering techniques needed in clinical research or treatment
2. Propose the analytical methods for clinical research or treatment
3. Introduce the engineering techniques with high potency for clinical research

The lecture is mostly presented by power point, and for some classes, handouts are provided.

●Textbook

Not specified, but distributed handouts if necessary.

●Additional Reading

It will be appointed if necessary.

●Grade Assessment

Reports (80%) and interview (20%)

●Notes

Not needed

●Contacting Faculty

At lecture time

Overview of space exploration and research (2.0credits) (宇宙研究開発概論)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester		
Lecturer	Leading Graduate		

●Course Purpose

This lecture course helps students to acquire a wide-ranging, panoramic knowledge of space research and development given by variety of lecturers from different academic fields.

●Prerequisite Subjects

Basic mathematics, Basic physics

●Course Topics

1. Space Exploration Projects
1.1 Overview of Space Exploration and Research
1.2 Space Projects
1.3 International Satellite and Spacecraft (HTV) Development
1.4 Project Management/Systems Engineering
1.5 Intelectual Properties in Business

2. Space Explorations on Observations
2.1 Space Propulsion Engineering
2.2 Materials Development for Space Applications
2.3 Space Observation Technologies
2.4 Introduction to Radiation Detectors and Electronics

3. Space-related Science
3.1 Foundations of Astrophysics
3.2 Earth and Planetary Science
3.3 Space Environment Science
3.4 Simulation Experiments

Report subject will be given at every lecture. The report should be submitted by the given deadline.

●Textbook

We do not specify the textbook. Lecture notes will be given as necessary.

●Additional Reading

Recommended readings will be give during lectures as necessary.

●Grade Assessment

Report must be submitted for each lecture. Proper understanding of each lecture's contents is evaluated. Passing average point is 60 out of 100.

●Notes

Students in "Leadership program for Space exploration and Research" are required to take this course before the qualifying examination. This course is open to any graduate students in Nagoya University.

●Contacting Faculty

Inquire contact method from the lecturer after the lecture

Advanced Mobility Program Basic Course (4.0credits) (先進モビリティ学基礎)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture and Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to cultivate comprehensive knowledge not only on specialized technical elements but also service and social impact of the mobility. The class will be provided not only by professors but also by engineers in industry. The course is organized as follows:

1. Understand fundamentals of automobile
2. Understand the trend on electrification of automobile
3. Understand the trend on on intelligence for automobile
4. Understand dependability, safety and human factor
5. Comprehensively study the mobility service
6. Comprehensively study the legal system for mobility

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

1. Fundamentals of automobile
2. Electrification of automobile
3. Intelligence for automobile
4. Dependability, safety and human factor
5. Mobility service
6. Legal system for mobility
7. Discussion and presentation

Read carefully the textbook before attending each class. After each class, solving the exercises in the

textbook is highly recommended. Submission of the report after each class is mandatory.

●Textbook
Original lecture note will be provided.

●Additional Reading
It will be announced in the class if necessary.

●Grade Assessment
Evaluation is based on total score of reports at each class and final presentation. You need more than mark of 60 out of 100 points. Special certificate will be provided for passed students.

●Notes
No particular requirement.

●Contacting Faculty
Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1F
Mail to: o_shimizu@nuem.nagoya-u.ac.jp

ced Mobility Program Practical Training Course(Autonomous Vehicle) (2.0credits) (先進モビリティ学実習（自動運

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise and Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to realization of autonomous drive by using 1/10 model car. Students develop the software system for autonomous driving. The course is organized as follows:

1. Understand architecture of autonomous drive
2. Understand the image processing for lane detection, and its implementation
3. Understand the control technique for lane following and its implementation

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

This course is aiming to realization of autonomous drive by using 1/10 model car. Students develop the software system for autonomous driving. The course is organized as follows:

1. Architecture of autonomous drive
2. Image processing for lane detection, and its implementation
3. Control technique for lane following and its implementation

Class is performed based on group activity.

●Textbook

Original lecture note will be provided.

●Additional Reading

It will be announced in the class if necessary.

ced Mobility Program Practical Training Course(Autonomous Vehicle) (2.0credits) (先進モビリティ学実習（自動運

●Grade Assessment

Evaluate based on attendance at lecture, total score of tasks set at each time, final presentation. Special certificate will be provided for passed students.

●Notes

No particular requirement

●Contacting Faculty

Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1F
Mail to: o_shimizu@nuem.nagoya-u.ac.jp

dvanced Mobility Program Practical Training Course(Electric Vehicle) (2.0credits) (先進モビリティ学実習（ＥＶ）

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise and Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	1 Autumn Semester
	1 Autumn Semester	1 Autumn Semester	
Lecturer	Faculty of Advanced Mobility Program		

●Course Purpose

To train students who can be active in the mobility industry or research institute. This course is aiming to design and analysis of EV formula car. In addition, Test drive is carried out. The course is organized as follows:1. Understand the mechanism of electric vehicle2. Understand the characteristics of motor and battery3. Understand the way of analysis and design of vehicle

●Prerequisite Subjects

Accepted basic engineering classes at Nagoya University Bachelor's degree, or equivalent knowledge.

●Course Topics

This course is aiming to design and analysis of EV formula car. In addition, Test drive is carried out. The course is organized as follows:1. Mechanism of electric vehicle2. Characteristics of motor and battery3. Way of analysis and design of vehicle Class is performed based on group activity.

●Textbook

Original lecture note will be provided.

●Additional Reading

It will be announced in the class if necessary.

●Grade Assessment

Evaluate based on attendance at lecture, total score of tasks set at each time, final presentation. You need more than mark of 60 out of 100 points. Special certificate will be provided for passed students.

●Notes

No particular requirement

●Contacting Faculty

Office hour:Wed.13:0014:00 @Green Vehicle Material Research Building 1FMail to: o_shimizu@nuem.nagoya-u.ac.jp

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook
Will be designated by each supervisor.

●Additional Reading
Will be designated by each supervisor.

●Grade Assessment
The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes
No conditions for taking the course

●Contacting Faculty
Supervisor of visiting university basically takes care.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook

Will be designated by each supervisor.

●Additional Reading

Will be designated by each supervisor.

●Grade Assessment

The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes

No conditions for taking the course

●Contacting Faculty

Supervisor of visiting university basically takes care.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

• To design and conduct an original research project
• To develop experience with experimental/numerical/theoretical techniques
• To develop a working knowledge of relevant research literature
• To practice scientific writing and participate in the peer review process
• To be able to discuss the research and topic with other scientists and engineers
The objective of this project is to increase the capability to find and to solve research problems by learning the research approaches and ideas of different research fields.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

• Students will develop (with guidance) a research project proposal at the beginning of the semester that will provide initiative, outline and experimental strategy.
• Each student will present oral reports of research progress, relevant readings, and/or challenges at scheduled lab meetings.
• Students will take primary responsibility for conducting research and do so with professional attitudes and time commitments. This is a lab course and you are expected to spend a minimum of 20 hours of productive lab work per week. It is more realistic to expect to spend an average of 25-30 hours per week working and thinking about your project.
• Students will produce a manuscript (with active feedback from the instructor and peers) that can be published in part or whole by a peer reviewed research journal. Publishable manuscripts require many drafts,

reviews, and revisions.
• Students are encouraged to present research results at appropriate scientific meetings.
• Students well be self-motivated and work independently, approaching the instructor for guidance regularly.

●Textbook
Will be designated by each supervisor.

●Additional Reading
Will be designated by each supervisor.

●Grade Assessment
The grade will be calculated according to the following criteria.
Written report following the same format as scientific paper... 50%; Presentation at the Workshop... 50%.
The acceptance standard is to understand the introduced research approaches and ideas.
Evaluation is done by the supervisor(s) at home and visiting universities.

●Notes
No conditions for taking the course

●Contacting Faculty
Supervisor of visiting university basically takes care.

International special lecture (1.0credits) (国際協働教育特別講義)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester		
Lecturer	Associated Faculty		

●Course Purpose

Gain basic knowledge of general engineering through English lectures on various hot research topics and leading technologies. The objective of this lecture is to develop research abilities and communication skills, which are essential to carry out international collaborative researches.

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

Depends on the lecturer.This course will be divided in 4 chapters as follows:1. Setting theme and reviewing literature2. Designing research plan3. Analysis and discussion of results4. Brief summary and future prospectsHomework will be given after the class and the report is required to be submitted in next class.

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

Written report and evaluation by the professors.

●Notes

No conditions for taking the course

●Contacting Faculty

In the class and E-mail.

International language exercise (1.0credits) (国際協働教育外国語演習)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Exercise		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Process Engineering
	Chemical Systems Engineering	Electrical Engineering	Electronics
	Information and Communication Engineering	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering
	Aerospace Engineering	Department of Energy Engineering	Department of Applied Energy
	Civil and Environmental Engineering		
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester		
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to provide Japanese students with the English classes or provide international students with Japanese classes to improve communication skills for both academic and daily life.

●Prerequisite Subjects

English, Technical English, Japanese

●Course Topics

Wide variety of exercises including speaking, listening, writing, reading, and presentation in Japanese/English.Homework will be given after the class and the report is required to be submitted in next class.

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

Report, presentation, participation in discussionGrading will be based on understanding Japanese and English, and communication performance.

●Notes

No conditions for taking the course

●Contacting Faculty

Acceptance and response in the class or through E-mail.

Ethics and Security in Engineering (2.0credits) (工学のセキュリティと倫理)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
	Department of Energy Engineering	Department of Applied Energy	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor		

●Course Purpose

The aim of the lecture is to understand ethics, intellectual property rights, information security required at the start of master thesis research. After taking this course, the students are expected to have abilities on:

1. Understanding of Ethics for engineers
2. Understanding of Ethics for researcher
3. Understanding of Intellectual property rights
4. Understanding of Information security

●Prerequisite Subjects

None because this is one of the common basic subject for future activity as a researcher or an engineer.

●Course Topics

1) Introduction,
2)Ethics for engineers,
3)Ethics for researchers,
4)Intellectual property rights,
5)Information security,
6)Summary

Submission of the report after each class is mandatory.

●Textbook

Instead of using textbook, original lecture notes will be provided at each class.

●Additional Reading

Original lecture notes will be provided at each class.

●Grade Assessment

Credits will be awarded to those students who score 'Pass' based on the reports and /or subjects given by each lecture.

●Notes

None because this is one of the common basic subject for future activity as a researcher or an engineer.

●Contacting Faculty

After each class student can ask in person.
Otherwise, contact to:

Pro. Suzuki
Ext. 2700, t_suzuki@nuem.nagoya-u.ac.jp

Safety and Reliability in Engineering (2.0credits) (安全・信頼性工学)

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
	Department of Energy Engineering	Department of Applied Energy	
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	1 Spring Semester
	1 Spring Semester	1 Spring Semester	
Lecturer	"YAMAMOTO Akio" Professor	Masahiro Arai Professor	Takaya INAMORI Associate Professor
	Part-time Faculty		

●Course Purpose

Safety and reliability are one of the most important issues in all engineering fields. In this lecture, the aerospace engineering field and nuclear engineering field, which are the symbolic entities of integrated engineering, will be linked, and the lecturers who have many years of experience in the space, aviation, and nuclear industries will understand students from other fields. The aim is to learn the basics and practice of safety and reliability engineering, while giving consideration to it. In addition, by attending this lecture with assignments and exercises, you can acquire the concept of ensuring safety and reliability in all industrial fields, and acquire useful skills regardless of progress in any field in the future.

By learning this lecture, the goal is to acquire the following skills.
(1) Understand and apply basic concepts of safety and reliability.
(2) Understand and apply safety concepts and application examples in the aerospace field.
(3) Understand and apply safety concepts and application examples in the field of nuclear power.

●Prerequisite Subjects

There are no special subjects required to take this course.

●Course Topics

(1) Basics of Safety and reliability engineering including FMEA and FTA
(2) Safety and reliability in aerospace engineering
(3) Safety fundamentals and safety design in nuclear engineering
(4) Hazard assessments in nuclear engineering
(5) Accidents in nuclear facilities and lessons learned

Gather information on relevant areas before each lecture. After the lecture, review the content and work on the examples again. To submit a report assignment in the first and second half, submit it.

●Textbook

Materials will be distributed in each lecture. Introduce textbooks as necessary.

●Additional Reading

References in Japanese, regarding to reliability analysis and FMEA, FTA.

●Grade Assessment

Evaluate the degree of achievement for the achievement target in the report. Understand the basic concepts of safety and reliability in the aerospace and nuclear fields, and pass if applicable.

●Notes

No registration requirements required

●Contacting Faculty

As a general rule, it corresponds to the break time during class hours and after the class ends. In other cases, it is possible to respond at any time.

Seminar on Solid Mechanics 2A (2.0credits) (固体力学セミナー2A)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the recent journal papers on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 2B (2.0credits) (固体力学セミナー2B)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the recent journal papers on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 2C (2.0credits) (固体力学セミナー2C)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the recent journal papers on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 2D (2.0credits) (固体力学セミナー2D)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the recent journal papers on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Solid Mechanics 2E (2.0credits) (固体力学セミナー2E)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	3 Spring Semester
Lecturer	Dai OKUMURA Professor

●Course Purpose

In this course, read the recent journal papers on solid mechanics and obtain advanced understanding.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Energy and Environmental Engineering 2A (2.0credits) (環境・エネルギー工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is 1. to fully understand advanced combustion engineering, and 2. to explore novel combustion technologies.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 2B (2.0credits) (環境・エネルギー工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is 1. to fully understand advanced combustion engineering, and 2. to explore novel combustion technologies.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering2C (2.0credits) (環境・エネルギー工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is 1. to fully understand advanced combustion engineering, and 2. to explore novel combustion technologies.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 2D (2.0credits) (環境・エネルギー工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is 1. to fully understand advanced combustion engineering, and 2. to explore novel combustion technologies.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Energy and Environmental Engineering 2E (2.0credits) (環境・エネルギー工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Ichiro NARUSE Professor	Ryo YOSHIIE Associate Professor	Yasuaki UEKI Associate Professor

●Course Purpose

Read a textbook and references to understand fundamental combustion theory as the core technology for high temperature energy conversion process. Students explain the details of the contents in turn. Further understanding of the latest research trend will be also discussed. The goal is 1. to fully understand advanced combustion engineering, and 2. to explore novel combustion technologies.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

No other specific requirements

●Contacting Faculty

Contact their supervisors via E-mail

Seminar on Statistical Fluid Engineering 2A (2.0credits) (統計流体工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
to cultivate the research ability through the presentation and discussion at the seminar

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A,1B,1C,1D

●Course Topics
1. Interim presentation and discussions on their research results, 2. Summary and discussions on the literature on their own research topic

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
nothing

●Additional Reading
nothing

●Grade Assessment
Achievement (degree of improvement of the research ability) is judged on the basis of the contents of presentation and discussions at seminar, and the term reports: The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Classes at master's course level

●Contacting Faculty
Discussions will be made at the seminar.

Seminar on Statistical Fluid Engineering 2B (2.0credits) (統計流体工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
to cultivate the research ability through the presentation and discussions at the seminar

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lecutures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A,1B,1C,1D, Seminar on Statistical Fluid Engineering 2A

●Course Topics
continued from seminar on Statistical Fluid Engineering 2A: 1. Interim presentation and discussions on their own reseach results, 2. Summary and discussions on the literature on their own research topic.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
nothing

●Additional Reading
nothing

●Grade Assessment
Achievement (degree of improvement of the research ability) is judged on the basis of the contents of presentation and discussions at seminar, and the term reports: The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Classes at master's course level

●Contacting Faculty
Discussions will be made at the seminar.

Seminar on Statistical Fluid Engineering 2C (2.0credits) (統計流体工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
to cultivate the research ability through the presentation and discussions at the seminar

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A, 1B, 1C, 1D, Seminar on Statistical Fluid Engineering 2A, 2B

●Course Topics
continued from Seminar on Statistical Fluid Engineering 2A, 2B: 1. Interim presentation and discussions on their own research results, 2. Summary and discussions on the literature on their own research topic.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
nothing

●Additional Reading
nothing

●Grade Assessment
Achievement (degree of improvement of the research ability) is judged on the basis of the contents of presentation and discussions at seminar, and the term reports: The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Classes at master's course level

●Contacting Faculty
Discussions will be made at the seminar.

Seminar on Statistical Fluid Engineering 2D (2.0credits) (統計流体工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
to cultivate the research ability through the presentation and discussions at the seminar

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A, 1B, 1C, 1D, Seminar on Statistical Fluid Engineering 2A, 2B, 2C

●Course Topics
continued from Seminar on Statistical Fluid Engineering 2A, 2B, 2C: 1. Interim presentation and discussions on their own research results, 2. Summary and discussions on the literature on their own research topic.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
nothing

●Additional Reading
nothing

●Grade Assessment
Achievement (degree of improvement of the research ability) is judged on the basis of the contents of presentation and discussions at seminar, and the term reports: The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Classes at master's course level

●Contacting Faculty
Discussions will be made at the seminar.

Seminar on Statistical Fluid Engineering 2E (2.0credits) (統計流体工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Yasuhiko SAKAI Professor	Yasumasa ITO Associate Professor	Koji IWANO Assistant Professor

●Course Purpose
to cultivate the research ability through the presentation and discussions at the seminar

●Prerequisite Subjects
Advanced Lectures on Mathematical Fluid Mechanics, Advanced Lectures on Statistical Fluid Engineering, Seminar on Statistical Fluid Engineering 1A, 1B, 1C, 1D, Seminar on Statistical Fluid Engineering 2A, 2B, 2C, 2D

●Course Topics
continued from Seminar on Statistical Fluid Engineering 2A, 2B, 2C, 2D: 1. Interim presentation and discussions on their research results, 2. Summary and discussions on the literature on their own research topic.

Students are expected pre-study the assigned part carefully and understand the contents so that they can explain the true interpretation including the background stories.

●Textbook
nothing

●Additional Reading
nothing

●Grade Assessment
Achievement (degree of improvement of the research ability) is judged on the basis of the contents of presentation and discussions at seminar, and the term reports: The full mark is 100 points and the passing mark is 60 points or more. The minimum requirement for getting credits is minimum understanding of the textbook. The result of the student who does not submit the term reports is handled as "absence".

●Notes
Classes at master's course level

●Contacting Faculty
Discussions will be made at the seminar.

Seminar on Thermal Control Engineering 2A (2.0credits) (熱制御工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
1. Seminars on related topics and papers on one's research program
2. Presentation of the research results and discussions

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
by oral presentation and discussion

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 2B (2.0credits) (熱制御工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
continued from Seminar on Heat Transfer and Combustion Engineering 2A

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
by oral presentation and discussion

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 2C (2.0credits) (熱制御工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
continured from Seminar on Heat Transfer and Combustion Engineering 2B

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
by oral presentation and discussion

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 2D (2.0credits) (熱制御工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering,
Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
continued from Seminar on Heat Transfer and Combustion Engineering 2C

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
by oral presentation and discussion

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Thermal Control Engineering 2E (2.0credits) (熱制御工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Hosei NAGANO Professor	"YAMAMOTO Kazuhiro" Associate Professor	Ai UENO Assistant Professor

●Course Purpose
To learn how to set up research subjects and to overcome difficulties in carrying out one's research program

●Prerequisite Subjects
Advanced Lecture on Combustion Engineering, :Seminar on Heat Transfer and Combustion Engineering 1

●Course Topics
continued from Seminar on Heat Transfer and Combustion Engineering 2D

●Textbook

●Additional Reading
Fundamental Aspects of Combustion; A. Linan and F.A. Williams (Oxford University Press)
Combustion; J. Warnatz et al. (Springer)
Combustion Theory; F. A. Williams (Benjamin/Cummings Publishing Company)
Turbulent Combustion; N. Peters (Cambridge UniversityPress)
Principles of Combustion; K. L. Kuo (John Wiley & Sons)
Combustion Physics; C. K. Law (Cambridge University Press)

●Grade Assessment
by oral presentation and discussion

10090 point: S8980 point: A7970 point: B6960 point: Cless than 59 pint: F

●Notes

●Contacting Faculty
/Anytime

Seminar on Biomechanics 2A (2.0credits) (バイオメカニクスセミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 1ASeminar on Biomechanics 1BSeminar on Biomechanics 1CSeminar on Biomechanics 1DStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 2B (2.0credits) (バイオメカニクスセミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 2AStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 2C (2.0credits) (バイオメカニクスセミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 2ASeminar on Biomechanics 2BStrength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 2D (2.0credits) (バイオメカニクスセミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 2A
Seminar on Biomechanics 2B
Seminar on Biomechanics 2C
Strength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.

Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.
E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Biomechanics 2E (2.0credits) (バイオメカニクスセミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	3 Spring Semester	
Lecturer	Takeo MATSUMOTO Professor	Eijiro MAEDA Associate Professor

●Course Purpose

This seminar is aimed to deepen the knowledge and understanding of biomechanics by reading the latest textbook and journal papers related to cell and tissue biomechanics as well as human dynamics. At the end of the seminar, students will gain the basic and advanced knowledge of biomechanics and related fields.

●Prerequisite Subjects

Seminar on Biomechanics 2A
Seminar on Biomechanics 2B
Seminar on Biomechanics 2C
Seminar on Biomechanics 2D
Strength of materials, continuum mechanics, fluid mechanics, dynamics of machinery, thermodynamics

●Course Topics

Reviews and presentations on the literatures in the field of research subject.

Students are supposed to conduct literature survey and the preparation for the presentations outside the course hours.

●Textbook

Specified at each class

●Additional Reading

Suggested at each class

●Grade Assessment

Students will be evaluated on the basis of active participation to the course and the understating of the topics covered in the course.

●Notes

Interested in other academic disciplines such as medicine, biology and physiology

●Contacting Faculty

Students can ask questions at the end of each seminar.
E-mail: takeo@mech.nagoya-u.ac.jp, e.maeda@nagoya-u.jp

Seminar on Computational Mechanics 2A (2.0credits) (計算力学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 2A, the students are going to understand advanced numerical analysis theory. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:1. Derivation of advanced mathematical model from the corresponding physical model2. Understanding various numerical methods for the corresponding advanced mathematical models3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Physical modelling and various partial differential equations 2. Boundary value and initial boundary value problem3. Advanced theories of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 2B (2.0credits) (計算力学セミナー2B　)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 2B, the students are going to understand advanced numerical analysis theory, following 2A. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:1. Derivation of advanced mathematical model from the corresponding physical model2. Understanding various numerical methods for the corresponding advanced mathematical models3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Physical modelling and various partial differential equations 2. Boundary value and initial boundary value problem3. Advanced theories of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 2C (2.0credits) (計算力学セミナー2C　)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 2C, the students are going to understand advanced numerical analysis theory, following 2B. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:1. Derivation of advanced mathematical model from the corresponding physical model2. Understanding various numerical methods for the corresponding advanced mathematical models3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Physical modelling and various partial differential equations 2. Boundary value and initial boundary value problem3. Advanced theories of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 2D (2.0credits) (計算力学セミナー2D　)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 2D, the students are going to understand advanced numerical analysis theory, following 2C. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:1. Derivation of advanced mathematical model from the corresponding physical model2. Understanding various numerical methods for the corresponding advanced mathematical models3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Physical modelling and various partial differential equations 2. Boundary value and initial boundary value problem3. Advanced theories of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Notes

No special requirements are imposed.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Computational Mechanics 2E (2.0credits) (計算力学セミナー2E　)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Toshiro MATSUMOTO Professor	Toru TAKAHASHI Associate Professor	IsakariHiroshi Assistant Professor

●Course Purpose

In the Computational Mechanics Seminar 2E, the students are going to understand advanced numerical analysis theory, following 2D. The seminar is based on the handouts and the students are going to give presentations for given assignments. By finishing this seminar, the students are targeted to have the capability of doing the following skills:

1. Derivation of advanced mathematical model from the corresponding physical model
2. Understanding various numerical methods for the corresponding advanced mathematical models
3. Practice of numerical computation for various engineering applications.

●Prerequisite Subjects

Mathematics I, II (Calculus, Linear Algebra), Vector Analysis, Complex Analysis, Elasticity, Continuum Mechanics

●Course Topics

1. Physical modelling and various partial differential equations
2. Boundary value and initial boundary value problem
3. Advanced theories of finite difference method, method of weighted residuals, finite element method, and boundary element method

●Textbook

Not used.

●Additional Reading

Not appointed.

●Grade Assessment

Reports and research presentations

●Notes

The understanding of the basic theory and computation algorithm of numerical methods is evaluated through assignments and presentations. Students can pass when the basic theory of numerical methods and its corresponding computational algorithm are understood. The grade is evaluated accordingly when they can formulate more advanced and complicated numerical methods and can develop the corresponding computer code.

●Contacting Faculty

Break after the seminar or during office hours

Seminar on Mechanical System Dynamics 2A (2.0credits) (機械力学セミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this seminar, students will develop the ability to set research subjects and solve problems through conducting research presentations and discussions on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, diagnosis).

The goal of this seminar is to be able to:
set research subjects on dynamic systems, and plan and execute a total processes from its modeling to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 2B (2.0credits) (機械力学セミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this seminar, students will develop the ability to set research subjects and solve problems through conducting research presentations and discussions on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, diagnosis).

The goal of this seminar is to be able to:
set research subjects on dynamic systems, and plan and execute a total processes from its modeling to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 2C (2.0credits) (機械力学セミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this seminar, students will develop the ability to set research subjects and solve problems through conducting research presentations and discussions on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, diagnosis).

The goal of this seminar is to be able to:
set research subjects on dynamic systems, and plan and execute a total processes from its modeling to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 2D (2.0credits) (機械力学セミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this seminar, students will develop the ability to set research subjects and solve problems through conducting research presentations and discussions on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, diagnosis).

The goal of this seminar is to be able to:
set research subjects on dynamic systems, and plan and execute a total processes from its modeling to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mechanical System Dynamics 2E (2.0credits) (機械力学セミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	3 Spring Semester	
Lecturer	Tsuyoshi INOUE Professor	Shota YABUI Assistant Professor

●Course Purpose

In this seminar, students will develop the ability to set research subjects and solve problems through conducting research presentations and discussions on mechanical systems (mechanics, mechanical dynamics, vibration analysis, control, vibration suppression, diagnosis).

The goal of this seminar is to be able to:
set research subjects on dynamic systems, and plan and execute a total processes from its modeling to their analysis and control.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Assistive Robotics 2A (2.0credits) (支援ロボティクスセミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

Compulsory subjects for mechanical students including kinematics, mehcanical dynamics, and control theory.

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 2B (2.0credits) (支援ロボティクスセミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 2C (2.0credits) (支援ロボティクスセミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 2D (2.0credits) (支援ロボティクスセミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Assistive Robotics 2E (2.0credits) (支援ロボティクスセミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Yoji YAMADA Professor	ShogoOKAMOTO Associate Professor	Yasuhiro AKIYAMA Assistant Professor

●Course Purpose

How do we design human support mechanical systems to further let them perform tasks in safe /intelligent manners? In the seminar, we make efforts to expand research discussions for the purpose of solving the above-mentioned question through :1)Surveying related studies, 2)Modeling the overall /a part of the human-machine system from the viewpoint of physics or information, and analyzing or synthesizing the model for developing a task-dependent system. Our goal is to acquire human-machine system methodologies for modeling and analysis /synthesis processes.

●Prerequisite Subjects

Control engineering, kinematics of machinery, vibration, signal processing, mechatronics, probability and statictics.

●Course Topics

1. Modeling and dynamics of human-machine systems
2. Probabilistic modeling for system safety
3. Motion analysis of human bodies and modeling of cognitive mechanism
4. Intelligent control of human machine systems

●Textbook

N/A

●Additional Reading

Dissmeminated from the students (presentators) in charge.

●Grade Assessment

Aural presentation and materials, and questions and answers are evaluated for a grade :presentation 45%, materials 35%, active participation in discussions 20%.
Note: Requested to get interested and to acquire wide academic knowledge in associated fields.

●Notes

●Contacting Faculty

It is mandatory to present questions/comments by a prescribed sheet as a contribution to the presentation.

Seminar on Vehicle Safety 2A (2.0credits) (自動車安全工学セミナー2A)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Read the necessary literature on technology and system related to human injury prevention,and understand research methods and trends.The objective of this seminar is as follows:1. Understand the principle of human body response necessary for constructing an injury prevention system.2. Understand and explain how to respond to human body responses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety 2B (2.0credits) (自動車安全工学セミナー2B)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Read the necessary literature on technology and system related to human injury prevention,and understand research methods and trends.The objective of this seminar is as follows:1. Understand the principle of human body response necessary for constructing an injury prevention system.2. Understand and explain how to respond to human body responses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety 2C (2.0credits) (自動車安全工学セミナー2C)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Read the necessary literature on technology and system related to human injury prevention,and understand research methods and trends.The objective of this seminar is as follows:1. Understand the principle of human body response necessary for constructing an injury prevention system.2. Understand and explain how to respond to human body responses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety 2D (2.0credits) (自動車安全工学セミナー2D)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Read the necessary literature on technology and system related to human injury prevention,and understand research methods and trends.The objective of this seminar is as follows:1. Understand the principle of human body response necessary for constructing an injury prevention system.2. Understand and explain how to respond to human body responses.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Vehicle Safety 2E (2.0credits) (自動車安全工学セミナー2E)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	3 Spring Semester
Lecturer	Kouji MIZUNO Professor

●Course Purpose

Read the necessary literature on technology and system related to human injury prevention,and understand research methods and trends.The objective of this seminar is as follows:1. Understand the principle of human body response necessary for constructing an injury prevention system.2. Understand and explain how to respond to human body responses.3. Read papers and understand the research field systematically.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 2A (2.0credits) (システム制御セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 2B (2.0credits) (システム制御セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 2C (2.0credits) (システム制御セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 2D (2.0credits) (システム制御セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Mathematical System Control 2E (2.0credits) (システム制御セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Mechanical Systems Engineering		
Starts 1	3 Spring Semester		
Lecturer	Shunichi AZUMA Professor	Toru ASAI Associate Professor	ARIIZUMI Ryo Assistant Professor

●Course Purpose

This course aims to survey on research trends in control engineering and study open problems. Students will obtain the knowledge of the state of the art of control systems and research ability.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomechanical Control 2A (2.0credits) (生体システム制御セミナー2A)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

We study and master theories and methodologies about advanced system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

There is nothing because this starts in the first semester.

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 2B (2.0credits) (生体システム制御セミナー2B)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	1 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 2A, We study and master theories and methodologies about advanced system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Seminar on Biomechanical control 2A

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 2C (2.0credits) (生体システム制御セミナー2C)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 2A and 2B, We study and master theories and methodologies about advanced system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Seminar on Biomechanical control 2A and 2B

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 2D (2.0credits) (生体システム制御セミナー2D)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	2 Autumn Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 2A, 2B and 2C, We study and master theories and methodologies about advanced system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Seminar on Biomechanical control 2A, 2B and 2C

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Biomechanical Control 2E (2.0credits) (生体システム制御セミナー2E)

Course Type	Specialized Courses
Division at course	Doctor's Course
Class Format	Seminar
Course Name	Mechanical Systems Engineering
Starts 1	3 Spring Semester
Lecturer	Koichi TAJI Associate Professor

●Course Purpose

Following to Seminar on Biomechanical control 2A, 2B, 2C and 2D, We study and master theories and methodologies about advanced system modeling and analysis by using textbooks and papers. We also become familiar with technical literature in English. We also acquire research planning methods and presentation technology.

Achievement target
1. Presenting the papers or textbooks you read exactly in detail
2. Presenting your research theme exactly

●Prerequisite Subjects

Seminar on Biomechanical control 2A, 2B, 2C and 2D

●Course Topics

Reading papers and several presentations of your research theme.

Making a pre-print of your presentation and distribute it at the seminor.

●Textbook

Introducing some textbooks and papers in the lecture if necessary

●Additional Reading

Introducing some textbooks and papers in the lecture if necessary

●Grade Assessment

Presentation (60%) and Discussion (40%). The pass line is 60%.

●Notes

nothing required

●Contacting Faculty

For general lectures, contact Prof. Taji.
If you have any questions outside of these hours, please contact the Professor by e-mail in advance.

Seminar on Mobility System 2A (2.0credits) (モビリティシステムセミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 2B (2.0credits) (モビリティシステムセミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 2C (2.0credits) (モビリティシステムセミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 2D (2.0credits) (モビリティシステムセミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Seminar on Mobility System 2E (2.0credits) (モビリティシステムセミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Mechanical Systems Engineering	
Starts 1	3 Spring Semester	
Lecturer	Tatsuya SUZUKI Professor	Hiroyuki OKUDA Assistant Professor

●Course Purpose

This lecture provides the knowledge and theory of the state of the art of the mobility systems and system science. This lecture grows the practical and creative problem-solving skills in these research fields.
Trainee would be expected to have the following knowledge and abilities when the lecture is finished:
1. To explain the needs, issues, technical difficulties and recent trends related to the mobility system field
2. To understand and explain one of examples of technical methodologies for comprehensive analysis and/or system design method for the mobility system with its users.

●Prerequisite Subjects

Mechatronics Engineering, Control Engineering, Information theory

●Course Topics

1. An example of theory and/or algorithm for the data analysis, digital signal processing and system control is selected as the main topic.
2. Fundamental knowledge, theory and mathematics the selected topic stands on, is introduced and learned for the understanding of the selected topic.
3. Methodologies, theory and algorithm, of selected topic is introduced.
4. Examples of application and latest trends of selected topic is introduced and discussed to understand how to exploit the theory and methodology of selected topic.
A trainee have to read and study the selected topic previously and have to prepare for the presentation and/or the discussion by understanding the related techniques and theory.

●Textbook

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Additional Reading

Book and/or papers related to the selected topic are chosen. Topic discussed in this lecture is selected at first, and related resources are provided.

●Grade Assessment

The trainee has a presentation to introduce the theory and/or methodologies related to selected topic, and the presentation, Q/A, and discussions are checked to evaluate their understanding and interpretability. Also the activeness in the discussion in every lecture is checked to evaluate the understanding of the topic.
The trainee who had active discussion and well understanding of the methodologies, theory and its strong and weak points is certificated. The score is evaluated by the qualities of presentation, activity and quality of the discussion, and the trainee marks 60 of 100 is certificated.

●Notes

Having a basic/fundamental knowledge about the calculus, linear algebra, statistics and probability theory, and system control.

●Contacting Faculty

Questions are accepted in the discussion in every lecture. The trainee is also possible to ask the general questions and the question for the preparation in usual office hours by getting an appointment.

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for one semester and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by studying in an abroad laboratory and learn different methods and ways of thinking, as well as communicate on a daily base with foreign researchers.

By completing the course, the students are expected to acquire various research methods and ways of thinking, gain the ability to tackle research problems from multiple angles, and acquire a broad international perspective.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject, English, Advanced Lectures on Scientific English

●Course Topics

Students will stay in an abroad laboratory that will be chosen based on the participant’s research field and interest. The course consists of the following contents.

1. Theme setting and literature review
2. Formulating a research plan
3. Analyzing the results and discussion
4. Presentation of the results

After the class, students should review the analyzing processes of the research results and investigate related literatures.

●Textbook
Will be introduced at the host laboratory depending on the research subject

●Additional Reading
Will be introduced at the host laboratory if necessary

●Grade Assessment
Conducting research in an abroad laboratory for two semesters and submitting a report is a prerequisite. Evaluation will be based on the student's report (50%) and oral presentation (50%). To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results.

●Notes
Nothing particularly needed

●Contacting Faculty
Questions will be answered by the supervisors at the host laboratory during the course.

Teaching and Instruction Exercise 1 (1.0credits) (実験指導体験実習1)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

While attendance is raw, in "the innovation experience project," I stand with a company engineer (DP, Directing Professor) and carry an assistance, DP of the attendance straight instruction by the DP and the role of the interface of the attendance student. In this way, it is intended to let you do experience of the project management.
I aim for planning a researcher, improvement of the nature as the leader, the expansion of the field of vision by a simulated experience of instruction of the attendance life and the business management in the real world.

●Prerequisite Subjects

"Innovation Practice Course" 75 hours(Principle one day a week)

●Course Topics

In "the innovation experience project," I assist the project promotion by the DP.
Help of the understanding of a project theme and contents for the attendance life of various specialisms
I compile an opinion of the attendance life and let you make a purpose, the method of the project clear
Exchange of opinions between the attendance life, instruction, report of the discussion
Communication adjustment that DP and attendance are raw
I assume this a main component.
In addition, correspondence out of the lecture time is necessary when preparations, an investigation to affect project accomplishment are necessary.

●Textbook

documents that a lecturer (DP) introduces it and shows.

●Additional Reading
documents that a lecturer (DP) introduces it and shows.

●Grade Assessment
I evaluate it through accomplishment, the discussion of the project. If display of leadership, report ability and the leadership is accepted, it is said that I pass.

●Notes
There are no prerequisites

●Contacting Faculty
A lecturer (DP) and this project staff of the university accept questions at any time.

Teaching and Instruction Exercise 2 (1.0credits) (実験指導体験実習2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Syusaku NAGANO Associate Professor		

●Course Purpose

The purpose of this course is to provide guidance to semester students for advanced science and engineering experiments at the Venture Business Laboratory. Through this research guidance, students will be able to play a comprehensive role as a researcher / educator and instructor in the field in charge of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation, and will be able to provide research guidance. Useful for practical training as a research leader.

●Prerequisite Subjects

Knowledge of the field in charge selected from the fields of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation.

●Course Topics

In the student experiment, the instructor students provide guidance to attendant students on subject research and original research from the field of Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation with the professional teacher. Together with the attendant students, they perform practical use these equipment and software and get the results. They experience the leadership of the research, providing research guidance, report preparation guidance, and presentation guidance.

●Textbook

Required documents is distributed.

●Additional Reading

Required documents is distributed.

●Grade Assessment

Evaluate by compiling experiments / exercises, teaching (70%), and interviewing (30%). Students who understand each device and software and give appropriate guidance are accepted, and their research results and new approaches are highly evaluated. A score of 60 or more out of 100 is a passing score.

●Notes

To have a deep understanding in one field from Raman spectroscopy, ionization potential measurement, X-ray diffraction measurement, and molecular simulation.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Research Internship2 U2 (2.0credits) (研究インターンシップ２ U2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days less than or equal to 20 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U3 (3.0credits) (研究インターンシップ２ U3)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 21 and 40 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U4 (4.0credits) (研究インターンシップ２ U4)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 41 and 60 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U6 (6.0credits) (研究インターンシップ２ U6)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days between 61 and 80 days in the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Research Internship2 U8 (8.0credits) (研究インターンシップ２ U8)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Materials Design Innovation Engineering
	Materials Process Engineering	Chemical Systems Engineering	Electrical Engineering
	Electronics	Information and Communication Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	Department of Energy Engineering
	Department of Applied Energy	Civil and Environmental Engineering	
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	
Lecturer	Hiroshi IKUTA Professor		

●Course Purpose

Research internship is different from conventional internship for a working experience. Staffs in the faculty and instructors in a company cooperate with each other to set up research themes adequate to the doctoral course, and supervise a long-term internship for 1-6 months. This course aims at training of a person who has ability for an advanced research and development in not only a specialized field but also a multidisciplinary field, and a leader capable of making a proper judgment in a research project.

●Prerequisite Subjects

Students attending Research Internship are strongly recommended to take short-term Patent Laws and Focus on Venture Business I or II before the attendance.

●Course Topics

A student applies for a theme for research set up under the cooperation of a company and Nagoya University. Students should attend at the lecture at the university on the duty of confidentiality and the protection of intellectual property rights before starting the internship.

●Textbook

not specified.

●Additional Reading

not specified.

●Grade Assessment

The credits will be given to the students who have had the working days more than or equal to 81 daysin the internship company.

●Notes

●Contacting Faculty

The questions will be answered by the direct supervisors as needed at the internship.

Laboratory Visit 1 U2 (2.0credits) (研究室ローテーション２ U2)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

Up to 20 days research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U3 (3.0credits) (研究室ローテーション２ U3)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

21 days or more and 40 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U4 (4.0credits) (研究室ローテーション２ U4)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

41 days or more and 60 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U6 (6.0credits) (研究室ローテーション２ U6)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

61 days or more and 80 days or less research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Laboratory Visit 1 U8 (8.0credits) (研究室ローテーション２ U8)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Applied Physics	Materials Physics	Chemical Systems Engineering
	Electrical Engineering	Electronics	Information and Communication Engineering
	Mechanical Systems Engineering	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty		

●Course Purpose

The aim of this course is to expand the student’s ability as a researcher by conducting a research at a different laboratory and learn different methods and ways of thinking, as well as communicate with other researchers in related fields.By completing the course, the students are expected to acquire various research methods and ways of thinking, and gain the ability to tackle research problems from multiple angles.

●Prerequisite Subjects

Basic and specialized subjects related to the research subject

●Course Topics

Students will conduct research at a different laboratory. The host laboratory will be chosen based on the participant’s research field and interest from other laboratories within the campus, other universities, research institutes and companies. The course consists of the following contents.1. Theme setting and literature review2. Formulating the research plan3. Analyzing the results and discussion4. Presentation of the resultsAfter the class, students should review the analyzing process of the obtained results and investigate related literatures.

●Textbook

Will be introduced at the host laboratory depending on the research subject

●Additional Reading

Will be introduced at the host laboratory if necessary

●Grade Assessment

81 days or more research in the host laboratory and submitting a report is a prerequisite. Evaluation will be based on the student's report and the evaluation by the supervisor in the host laboratory. To pass, the students have to demonstrate that they have the capacity to adequately analyze the results and have acquired the basic knowledge to interpret the results. Grading will be decided from P (pass) or NP (not passed).

●Notes

Nothing particularly needed

●Contacting Faculty

Questions will be answered by the supervisors at the host laboratory during the course.

Seminar on medical engineering (2.0credits) (医工連携セミナー)

Course Type	Comprehensive engineering courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
	Materials Process Engineering	Chemical Systems Engineering	Mechanical Systems Engineering
	Micro-Nano Mechanical Science and Engineering	Aerospace Engineering	
Starts 1	Spring Semester	Spring Semester	Spring Semester
	Spring Semester	Spring Semester	Spring Semester
	Spring Semester	Spring Semester	
Lecturer	Associated Faculty		

●Course Purpose

In the coming decades with growing overage population, novel technologies and outstanding ideas for the new breakthrough strategy of tailor-made medical therapy is strongly required. For the establishment of such strategy, basic technologies that enable the detection and diagnosis of molecular dynamics should be investigated. In this class, we try to educate young researchers to step out to this new frontier by setting various types of classes held by very advanced researchers in medical engineering field in Nagoya University. The lecturers are invited from engineering faculty and medical faculty, and introduce the expected ideas and the most recent achievements in the aspect of medical engineering.

●Prerequisite Subjects

Clinical medicine, Molecular biology, Biological engineering, Biomechanics, Robotics, Medical engineering, Bioinformatics

●Course Topics

In every lecture, different lectures invited from different fields (engineer, doctors, etc.) teach the most recent advances in the field of medical engineering. The lecture is mostly presented by power point, and for some classes, handouts are provided.

●Textbook

Not specified, but distributed handouts if necessary.

●Additional Reading

It will be appointed if necessary.

●Grade Assessment

Reports (80%) and interview (20%)

●Notes

Not needed

●Contacting Faculty

At lecture time