Aerospace Fluid Dynamics (2.0credits) (航空宇宙流体力学)

Course Type	Basic Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor

●Course Purpose

To understand fundamentals of turbulence and to learn computational fluid dynamics.

Achievement Objectives:
To understand fundamentals of turbulence such as velocity correlation and scales and to be able to explain mean and fluctuating flow fields in typical turbulent flows.
To understand the basic theory of Computational Fluid Dynamics, and to be familiar with the analysis software that applies the finite difference methods or the finite volume methods.

●Prerequisite Subjects

Fundamentals of Fluid Mechanics with Exercises
Viscous Fluid Mechanics with Exercises
Potential Flows
Compressible Fluid Mechanics with Exercises

●Course Topics

Basics of compressible fluid dynamics and flow with shock wave
Riemann problem
Sonic boom

Fundamentals of turbulence
Velocity correlation, Scales, Spectra, and Energy cascade
Typical turbulence (isotropic turbulence, turbulent boundary layer, channel flow, jets, turbulent mixing layer, grid turbulence)

Linear convection equation, finite difference method, linear stability analysis
Characteristics of Euler equation related to Upwind schemes
Upwind schemes and MUSCL

●Textbook

A. Sasoh, Compressible Fluid Dynamics and Shock Waves, CORONA PUBLISHING CO., LTD.
Related materials are distributed.

●Additional Reading

S. Kida and S. Yanase, Turbulence Dynamics, Asakura Shoten
Kozo Fujii, Numerical methods of Fluid dynamics, University of Tokyo Press

●Grade Assessment

The score is based on three examinations.
The full mark is 100 points, and the passing mark is 60 points or more.
The result for the absentee of the examination more than two times is handled as "absence".

100-90(and within top 10%):S, 89-80:A, 79-70:B, 69-60:C, 59-0:F

●Notes

Nothing

●Contacting Faculty

After the classes or exercises.

Aerospace Control Systems (2.0credits) (航空宇宙制御)

Course Type	Basic Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose

Control systems for aircraft and spacecraft are usually required to have dependability and considerably high control performance. The purpose of this lecture is to understand several advanced approaches to controller synthesis and challenges in actual implementation stages.
Though this lecture, students will be able to understand the characteristics of each design method and choose a suitable one for given control problems.

●Prerequisite Subjects

Lectures on Classical Control, Modern Control and Optimal Control

●Course Topics

Review of the linear modern control and its practical application methods
1. Optimal regulator
2. Stochastic optimal control
3. Frequency-shaped optimal control
4. Output feedback control
5. Linear robust control

Introduction to nonlinear control theory and its application to aerospace systems
6. Examples of nonlinear systems in aerospace engineering
7. Equilibria and small-time local controllability (STLC) around an equilibrium
8. Lack of STLC due to linear approximation
9. Lie algebra and a sufficient condition for STLC
10. Feedback linearization and zero dynamics

Flight control systems for actual aircraft
11. Fundamentals of manual and automatic flight control systems
12. Implementation of flight control systems
13. Design of flight control laws
14. Guidance and navigation

Several assignments will be imposed.

●Textbook

(1 - 5)
Nonami, K., Nishimura, H. and Hirata, M., Control Systems Design by MATLAB, Tokyo Denki University Press, 1998

(6 - 10)
Not specified. Textbooks in 'Additional Reading' cover the topics in the lecture.

(11 - 14)
Handouts will be distributed in the lectures.

●Additional Reading

(1 - 5)
Nonami, K. and Nishimura, H., Control Theory Basics by MATLAB, Tokyo Denki University Press, 1998

(6 - 10)
Hassan Khalil, Nonlinear Systems, Prentice Hall, 2002
Jean-Michel Coron, Control and nonlinearity, American Mathematical Society, 2007
Jun-ichi Imura, Stability Theory in Systems and Control, Corona Publishing, 2000 (in Japanese)
William J. Terrell, Stability and Stabilization, Princeton University Press, 2009
Kiyotaka Shimizu, Feedback Control Theory - Stabilization & Optimization -, Corona Publishing, 2013 (in Japanese)

(11- 14)
Introduced in the lectures if necessary.

●Grade Assessment
Graded on the basis of several reports regarding the topics dealt with in the lecture.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty
Questions are mainly accepted in the lectures and just after the lectures. Students can also ask for an appointment for questions by email.

Aerospace Structures (2.0credits) (航空宇宙構造)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Masahiro Arai Professor	Atsuhiko YAMANAKA Professor	Akinori YOSHIMURA Associate Professor

●Course Purpose

This lecture teaches the foundations of the structures and materials used in the airplanes and spacecrafts. In particular, students will study characteristics of the aerospace structure, and the basic method for analyzing the aerospace structure. Besides, they will study characteristics and analysis method for advanced composite materials, which are often used in the recent aerospace structure. Moreover, the lecturers from outside organization will present cutting-edge research topics.

This lecture provides to students basic knowledge of analysis methods for aerospace structure and material.

Goals:
1. To understand and explain the characteristics of the aerospace structures.
2. To understand the analysis method for aerospace structure, and to solve the specific problems by using it.
3. To understand and explain the characteristics of advanced composite materials used for aerospace structures and test methods for them.
4. To understand the estimation method for material properties of laminates of advanced composite materials, and to solve the specific problems.

●Prerequisite Subjects

Mechanics of Materials,
Material Sciences,
Solid Mechanics,
Structural Mechanics,
Composite Materials,
Vibration Engineering,
Fluid Mechanics

●Course Topics

This lecture consists of the following topics:
1. Production of Composite Materials,
2. Strength of Composite Materials,
3. Numerical Analyses of Composite Materials,
4. Introduction of Aerospace Structure,
5. Plate Theory,
6. Bending Theory of the Thin Plate Structure,
7. Torsion Theory of the Thin Plate Structure, and
8. Design and Analysis of the Aerospace Structure.

Moreover, the lecturers from outside organization will present cutting-edge research topics.

Reports and small tests will be assigned in order to check the attainment.

●Textbook

A textbook is not designated in this lecture. Materials will be distributed in the class.

●Additional Reading

For topics 1-3:
1. Mechanics of Composite Materials, Introduction to Engineering Beginners,
edited by Hiroshi Suemasu, Baifukan
2. Introduction to Mechanics of Composite Materials, wrote by Hiroshi Fukuda and Goichi Ben, Kokon-shoin

For topics 4-8:
1. Mechanics of Aircraft Structure, wrote by Shigeo Kobayashi, Pleiades publishing
2. Fundamentals and Practices of Analyses of Aircraft Structure, wrote by Toshimi Taki, Pleiades publishing
3. Aircraft structures, wrote by David J. Peery, McGraw-Hill

●Grade Assessment

Attainment of goals will be evaluated by reports and small tests assigned in the class. The full mark is 100 points, and the passing mark is 60 points or more.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Students may ask questions during and after the class. If students want to discuss on the other time, please make an appointment via email.
Questions via email are also welcome.
email:
akinori.yoshimura@mae.(Add nagoya-u.ac.jp)
masahiro.arai@(Add nagoya-u.jp)

Aerospace Thermal Engineering (2.0credits) (航空宇宙熱工学)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Part-time Faculty

●Course Purpose

The aim of this course is to cultivate the ability to discuss issues related to heat, heat transfer and thermal fluid in aerospace engineering. Especially, the following two goals are set.
1. The goal is to be able to calculate the thermochemical properties of combustion quantitatively.
2 The goal is to be able to calculate the thermal characteristics of aerospace engines quantitatively.
At the end of the class, students will be able to quantitatively discuss the issues that student set themselves.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Structural Mechanics 1A (2.0credits) (構造力学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the fundamental knowledge about the advanced material and structural technologies used in the aerospace field.

The goal of this seminar is to get the fundamental knowledge of the advanced material and structural technologies, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Mechanics of Materials Solid Mechanics Composite Materials, Applied Theory of Structural Mechanics, Vibration Engineering, Control Engineering, Fluid Mechanics

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 1B (2.0credits) (構造力学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the fundamental knowledge about the advanced material and structural technologies used in the aerospace field.

The goal of this seminar is to get the fundamental knowledge of the advanced material and structural technologies, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Solid Mechanics, Composite Materials, Applied Theory of Structural Mechanics, Vibration Engineering, Control Engineering, Fluid Mechanics

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 1C (2.0credits) (構造力学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the deeper knowledge about the advanced material and structural technologies used in the aerospace field.

The goal of this seminar is to get the deeper knowledge of the advanced material and structural technologies, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Mechanics of Materials Solid Mechanics Composite Materials, Applied Theory of Structural Mechanics, Vibration Engineering, Control Engineering, Fluid Mechanics
Seminar on Structural Mechanics 1-A and 1-B

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.
It is desirable that students have got the credits of the following seminars:
Seminar on Structural Mechanics 1-A and 1-B.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 1D (2.0credits) (構造力学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the deeper knowledge about the advanced material and structural technologies used in the aerospace field.

The goal of this seminar is to get the deeper knowledge of the advanced material and structural technologies, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Mechanics of Materials Solid Mechanics Composite Materials, Applied Theory of Structural Mechanics, Vibration Engineering, Control Engineering, Fluid Mechanics
Seminar on Structural Mechanics 1-A and 1-B

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.
It is desirable that students have got the credits of the following seminars:
Seminar on Structural Mechanics 1-A and 1-B.

●Contacting Faculty

Accepted during the seminar.

Seminar on Control Systems Engineering 1A (2.0credits) (制御システム工学セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose

The objective of this seminar is to deepen understanding of theoretical and practical aspects of control systems design through research on control problems in aerospace engineering and related fields. Students will be able to conduct (i) modeling of dynamics behavior of control systems, (ii) appropriate choice of design methods, (iii) numerical simulations and experiments.

●Prerequisite Subjects

Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics

Students conduct surveys and research on recent topics in control engineering. Presentation and discussion on the results are also required.

●Textbook

Not specified in advance due to variety of themes to be addressed in the seminar.

●Additional Reading

Specified in the seminar if necessary.

●Grade Assessment

Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes

It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty

Accepted during the seminar.

Seminar on Control Systems Engineering 1B (2.0credits) (制御システム工学セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose
The objective of this seminar is to deepen understanding of theoretical and practical aspects of control systems design through research on control problems in aerospace engineering and related fields. Students will be able to conduct (i) modeling of dynamics behavior of control systems, (ii) appropriate choice of design methods, (iii) numerical simulations and experiments.

●Prerequisite Subjects
Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics
Students conduct surveys and research on recent topics in control engineering. Presentation and discussion on the results are also required.

●Textbook
Not specified in advance due to variety of themes to be addressed in the seminar.

●Additional Reading
Specified during the seminar if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty
Accepted during the seminar.

Seminar on Control Systems Engineering 1C (2.0credits) (制御システム工学セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Spring Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose

The objective of this seminar is to deepen understanding of theoretical and practical aspects of control systems design through research on control problems in aerospace engineering and related fields. Students will be able to conduct (i) modeling of dynamics behavior of control systems, (ii) appropriate choice of design methods, (iii) numerical simulations and experiments.

●Prerequisite Subjects

Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics

Students conduct surveys and research on recent topics in control engineering. Presentation and discussion on the results are also required.

●Textbook

Not specified in advance due to variety of themes to be addressed in the seminar.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes

It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty

Accepted during the seminar.

Seminar on Control Systems Engineering 1D (2.0credits) (制御システム工学セミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose
The objective of this seminar is to deepen understanding of theoretical and practical aspects of control systems design through research on control problems in aerospace engineering and related fields. Students will be able to conduct (i) modeling of dynamics behavior of control systems, (ii) appropriate choice of design methods, (iii) numerical simulations and experiments.

●Prerequisite Subjects
Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics
Students conduct surveys and research on recent topics in control engineering. Presentation and discussion on the results are also required.

●Textbook
Not specified in advance due to variety of themes to be addressed in the seminar.

●Additional Reading
Specified during the seminar if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty
Accepted during the seminar.

Seminar on Fluid Dynamics 1A (2.0credits) (流体力学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose
study fundamentals and applications of fluid dynamics related with aerospace engineering.

●Prerequisite Subjects
1. Incompressible Fluid Dynamics
2. Viscous Fluid Dynamics
3. Comressible Fluid Dynamics
4. Computational Fluid Dynamics (CFD)

●Course Topics
1. Shear layer
2. Theory of flow stability
3. Transition and turbulence
4. Lift and drag
5. Vortex motion
6. Natural convection and forced convection

●Textbook
Handout

●Additional Reading
Will be introduced when necessary

●Grade Assessment
Presentation to explain the part in charge

●Notes

●Contacting Faculty
At any time

Seminar on Fluid Dynamics 1B (2.0credits) (流体力学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective: To study fundamentals and applications of fluid dynamics related with aerospace engineering. (Part 2)

●Prerequisite Subjects

1. Incompressible Fluid Dynamics
2. Viscous Fluid Dynamics
3. Compressible Fluid Dynamics
4. Computational Fluid Dynamics

●Course Topics

1. High enthalpy flow
2. Non-equilibrium flow
3. Compressible flow
4. Aerodynamic interaction
5. Aerodynamic heating:Aeroacoustics
6. Jet

●Textbook

Handout

●Additional Reading

Will be introduced

●Grade Assessment

Presentation to explain the part in charge

●Notes

●Contacting Faculty

At any time

Seminar on Fluid Dynamics 1C (2.0credits) (流体力学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose
To study aerodynamics related with aerospace engineering

●Prerequisite Subjects
1. Incompressible Fluid Dynamics
2. Viscous Fluid Dynamics
3. Compressible Fluid Dynamics
4. Computational Fluid Dynamics

●Course Topics
1. Delta wing
2. Stall and Spin motion
3. Unsteady aerodynamics
4. High lift devices
5. Parachute aerodynamics

●Textbook
Handout

●Additional Reading
Will be introduced

●Grade Assessment
Presentation to explain the part in charge

●Notes

●Contacting Faculty
At any time

Seminar on Fluid Dynamics 1D (2.0credits) (流体力学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective: To Study Computational Fluid Dynamics related with:aerospace engineering

●Prerequisite Subjects

1. Incompressible Fluid Dynamics
2. Viscous Fluid Dynamics
3. Compressible Fluid Dynamics
4. Computational Fluid Dynamics

●Course Topics

1. Fundamentals of numerical analysis
2. Upwind differencing
3. Higher order schemes
4. Structured and unstructured grids
5. ENO scheme and WENO scheme
6. Godunov method
7. Roe method
8. AUSM method

●Textbook

Handout

●Additional Reading

No specific

●Grade Assessment

Presentation to explain the part in charge

●Notes

●Contacting Faculty

At any time

Seminar on Shock Wave and Space Propulsion 1A (2.0credits) (衝撃波・宇宙推進セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 1B (2.0credits) (衝撃波・宇宙推進セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 1C (2.0credits) (衝撃波・宇宙推進セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 1D (2.0credits) (衝撃波・宇宙推進セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Propulsion Energy Systems Engineering 1A (2.0credits) (推進エネルギーシステム工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Revisit the fundamental knowledge required for your deeper understanding the basic principles of various propulsion energy systems and master how to use it for your own insight

●Prerequisite Subjects

●Course Topics

Through discussion on popular systems, learn how to use thermodynamics

●Textbook

●Additional Reading

●Grade Assessment

Oral presentation

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 1B (2.0credits) (推進エネルギーシステム工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Revisit the fundamental knowledge required for your deeper understanding the basic principles of various propulsion energy systems and use it for your own insight

●Prerequisite Subjects

●Course Topics

Through discussion on popular systems, learn how to use fluid dynamics

●Textbook

●Additional Reading

●Grade Assessment

Oral presentation

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 1C (2.0credits) (推進エネルギーシステム工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Revisit the fundamental knowledge required for your deeper undestanding the basic principles of various propulsion energy systems and use it for your own insight

●Prerequisite Subjects

●Course Topics

Through discussion on popular systems, learn how to use dynamics

●Textbook

●Additional Reading

●Grade Assessment

Oral presentation

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 1D (2.0credits) (推進エネルギーシステム工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Revisit the fundamental knowledge required for your deeper undestanding the basic principles of various propulsion energy systems and use it for your own insight

●Prerequisite Subjects

●Course Topics

Understand the fundamental structure of current jet engines and rocket engines

●Textbook

●Additional Reading

●Grade Assessment

Oral presentation

●Notes

●Contacting Faculty

Seminar on Production Engineering 1A (2.0credits) (生産工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to understand fundamentals of production engineering such as machining, machine tool, control, measurement and simulation technologies.The goal of this course is to be able to explain and apply the above fundamentals.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn machining, machine tool, control, measurement, and simulation technologies in production engineering through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 1B (2.0credits) (生産工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to understand fundamentals of production engineering such as machining, machine tool, control, measurement and simulation technologies.The goal of this course is to be able to explain and apply the above fundamentals.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn machining, machine tool, control, measurement, and simulation technologies in production engineering through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 1C (2.0credits) (生産工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to understand fundamentals of production engineering such as machining, machine tool, control, measurement and simulation technologies.The goal of this course is to be able to explain and apply the above fundamentals.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn machining, machine tool, control, measurement, and simulation technologies in production engineering through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 1D (2.0credits) (生産工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to understand fundamentals of production engineering such as machining, machine tool, control, measurement and simulation technologies.The goal of this course is to be able to explain and apply the above fundamentals.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn machining, machine tool, control, measurement, and simulation technologies in production engineering through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Aerospace Vehicle Dynamics 1A (2.0credits) (航空宇宙機運動システム工学セミナー1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 1B (2.0credits) (航空宇宙機運動システム工学セミナー1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics1 C (2.0credits) (航空宇宙機運動システム工学セミナー1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 1D (2.0credits) (航空宇宙機運動システム工学セミナー1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Advanced Composite Materials 1A (2.0credits) (先進複合材料セミナー1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the basis of the researches of advanced fiber reinforced plastics for a puropous of application for the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics,

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 1B (2.0credits) (先進複合材料セミナー1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the basis of the researches of advanced fiber reinforced plastics for a puropous of application for the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 1C (2.0credits) (先進複合材料セミナー1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the basis of the researches of advanced fiber reinforced plastics for a puropous of application for the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the bigining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 1D (2.0credits) (先進複合材料セミナー1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the basis of the researches of advanced fiber reinforced plastics for a puropous of application for the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the bigining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

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 Propulsion Systems (2.0credits) (推進システム特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor

●Course Purpose

After completing this course, students will be able to understand the physics of aerospace propulsion, such as jet engine, rocket engine, electric propulsion, etc., with their applications.

Through this course, students can obtain following abilities.
1) To explain principle of the aerospace propulsion.
2) To evaluate their performance such as thrust and Isp.
3) To evaluate technical issues in their applications.

●Prerequisite Subjects

Mathematics, Physics, Chemistry, Thermodynamics, Fluid Dynamics, Compressible Fluid DynamicsCombustion Engineering

●Course Topics

Principle of jet propulsion
Cycle analysis and performance
Ramjet/scramjet
Introduction of rocket propulsion
Reusable space transportation
Orbital transfer vehicle
Liquid propulsion
Airbreathing propulsion
Electric propulsion
Practice of space project
Report of homework assigned at each lecture.

●Textbook

●Additional Reading

Goebel and Katz, Fundamentals of Electric Propulsion: Ion and Hall Thrusters, JPL Space Science & Technology Book Series
George P. Satton, Oscar Biblarz, Rocket Propulsion Elements, Ninth Edition, Wiley
Dieter K. Huzel, David H. Huang, Modern Engineering For Design of Liquid-Propellant Rocket Engines, AIAA
Saeed Farokhi, Aircraft Propulsion, Second Edition, Wiley
Phillip Hill, Mechanics and Thermodynamics of Propulsion, Second Edition, Addison-Wesley

●Grade Assessment

The abilities are measured through each report of homework (100 points in total). The passing score is 60 points.

●Notes

●Contacting Faculty

If you have any questions, ask away in class, or contact uprightly after lecture, by telephone or e-mail.

Contact address
Prof. Sasoh, ext:4402akihiro.sasoh@mae

Advanced Lectures on Propulsion Systems (2.0credits) (推進システム特論)

Assoc. Prof. Kinefuchi, ext:4413, kiyoshi.kinefuchi@mae

Advanced Lectures on Aircraft Systems (2.0credits) (航空機システム特論)

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

●Course Purpose

The aim of this class is acquiring knowledge about recent studies on aircraft After attending the classes, we will be able to express our thoughts about aircraft in future.

●Prerequisite Subjects

Fluid dynamics, structural mechanics, propulsion engineering and control engineering

●Course Topics

- Advanced aerodynamic testing technologies
- Numerical simulation technologies for aerodynamics, acoustics and vibration
- Design and test of hyper sonic engines and hydrogen engines
- Curing methods for composite materials and heat-resistant composite materials
- Electronic properties of composite materials and damage from lighting strikes
- Flight dynamics and flight test techniques
- A Flight test in 2020

No study before the classes is required. After the classes, you should read the delivered prints carefully for making your reports.

●Textbook

None. Prints will be delivered.

●Additional Reading

Will be introduced in the class as necessary.

●Grade Assessment

Your final grade will be decided by Reports100). A passing score is a score of 60% or up.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Will be announced in the class.

Advanced Lectures on Spacecraft Systems (2.0credits) (宇宙機システム特論)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Takaya INAMORI Associate Professor	Part-time Faculty

●Course Purpose

This lecture introduces satellite systems, specifically attitude dynamics and ADCS (Attitude determination and control system) in Earth orbiting satellites and interplanetary spacecraft. Students also learn a way of thinking for satellite system design and development.1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the charactaristics of space sysytems.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Satellite attitude dynamics2. Space environment3. Attitude sensors and determination4. Attitude actuators and control5. ADCS in interplanetary spacecraft6. Example in space missions7. Spacecraft designIn the lecture, students will submit their related studies in a report.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Hugehes, Spacecraft Attitude Dynamics, 1986.James R. Wertz, Spacecraft Attitude Determination and Control James,1978.Hanspeter Schaub and John Junkins, Analytical Mechanics of Space Systems, 2014., , , 1999.220141993200119941I19982007

●Grade Assessment

The level of achievements is evaluated through reports and the final exam. For credit, students must achieve the level to deal with elementary problems correctly in the report and the final exam. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Advanced Lectures on Aerospace Manufacturing (2.0credits) (航空宇宙機生産工学特論)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor

●Course Purpose

Understanding of basic principles on manufacturing processes, production facilities like machine tools which are necessary for aerospace engineers and researchersThe goal of this course is to be able to explain the above principles and facilities.

●Prerequisite Subjects

●Course Topics

Mechanics of cutting, material processing, non-traditional machining, etc. Production facilities, especially machine tools, and their related topics like dynamic and static characteristics, chatter vibration problems due to machining processes, numerical control, machine elements, etc.Read through handouts or teaching materials before the course.

●Textbook

●Additional Reading

Yusuf Altintas: “Manufacturing AutomationMetal Cutting Mechanics, Machine Tool Vibrations, and CNC Design”, Cambridge University Press

●Grade Assessment

Report/examination

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jpNorikazu SuzukiExt.4491, nsuzuki@mech.nagoya-u.ac.jp

Advanced Lectures on Aircraft International Development Project (2.0credits) (航空機国際開発プロジェクト特論)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Jiro KASAHARA Professor Part-time Faculty	Akihiro SASOH Professor	DAISUKE Ichihara Assistant Professor

●Course Purpose

The objective is to produce talented graduates to lead the aviation industries. Based on the collaborative framework between the academy and the industry, the practical and creative education is provided by the industry teaching staff with the aviation actual know-how, throughout on the development, design, production, sales and operation of commercial aircraft.

●Prerequisite Subjects

Basic Engineering in Aeronautics, English

●Course Topics

(1)System Integration　Importance in Aircraft Development　Overall Flow of Integration　Requirement Capturing, Function Analysis, Design Synthesis　System Analysis, System Control　Actual Case Study (2)Aircraft Systems Design　Overview of Systems　Design　Analysis　System Schematics　System Installation　Supplier Control　Test Evaluation　Certification (3)Aircraft Safety Assessment　Basic Concept　Regulations　Type Certification　Design Qualification　Manufacturing Qualification　Structure　Systems　Software (4)Aircraft Production　Overview of Production　Production Planning　Production Engineering　Supplier Control　Quality Control

●Textbook

Handout

●Additional Reading

●Grade Assessment

Homework

●Notes

●Contacting Faculty

Jiro KasaharaDepartment of Aerospace Engineeringkasahara@nuae.nagoya-u.ac.jp052-789-4404

Exercises on Aircraft International Development Project (2.0credits) (航空機国際開発プロジェクト演習)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Akihiro SASOH Professor	Jiro KASAHARA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

In order to improve the practical knowledge and the capability of planning, implimentation, communication and negociation which are necessary for international commercial aircraft development projects, practises supervised by instructors including those from industry and native English speakers are conducted.

●Prerequisite Subjects

Basic aeronautics, English

●Course Topics

1.Aircraft design and manufacturing(1)Basics of Design Build-up Team(DBT)(2)Product plan and conceptual design (3)Project management (4)System engineering / Requirement engineering(5)New technologies (6)Manufacturing and certification (7)PLM (Product Lifecycle Management) 2.Negotiation and presentation(1)Essential business skills(2)Cross cultural communication (3)Communication style (4)Negotiation protocol(5)Negotiation role play practice(6)Presentation practice(7)Final presentation

●Textbook

Handout

●Additional Reading

Will be introduced in the class.

●Grade Assessment

Homework and presentation.

●Notes

●Contacting Faculty

Jiro KasaharaDepartment of Aerospace Engineeringkasahara@nuae.nagoya-u.ac.jp052-789-4404

Advanced Experiments and Exercises in Fluid Mechanics A (1.0credits) (流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	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose
Study fluid dynamics more in depth by joining various activities performed in the fluid dynamics laboratory to promote each student's research

●Prerequisite Subjects
All the Fluid dynamical subjects (Potential flow etc)

●Course Topics
Join various activities performed in the Fluid Dynamics Laboratory

●Textbook
Text books and references are introduced in the class.

●Additional Reading
Text books and references are introduced in the class.

●Grade Assessment
Evaluate based on the degree of activeness and contribution to each activity

●Notes
Nothing

●Contacting Faculty
At any time

Advanced Experiments and Exercises in Fluid Mechanics B (1.0credits) (流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	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose
Study fluid dynamics more in depth by joining various activities held in the Fluid Dynamics Laboratory to promote each student' resesarch (Part 2)

●Prerequisite Subjects
Fluid dynamics (Especially Potential flows etc.)

●Course Topics
Join various activities held in the Fluid Dynamics Laboratory alone or as a team

●Textbook
Text books and references will be introduced in the class.

●Additional Reading
Text books and references will be introduced in the class.

●Grade Assessment
Evaluate by watching how well each sutdent is doing in such activities

●Notes
Nothing

●Contacting Faculty
At any time

d Experiments and Exercises in Shock Wave and Space Propulsion A (1.0credits) (衝撃波・宇宙推進特別実験及

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose

To learn about shock waves, compressible fluid dynamics and space propulsion, and how to apply the related knowledge to practical problems.

●Prerequisite Subjects

Compressible fluid dynamics, Propulsion systems

●Course Topics

To conduct experiments and practices on shock waves and space propulsion.

●Textbook

Will be introduced in the class.

●Additional Reading

Akihiro Sasoh, "Compressible fluid dynamics and Shock Waves," Springer, 2020.

●Grade Assessment

Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty

Time window will be specified.

d Experiments and Exercises in Shock Wave and Space Propulsion B (1.0credits) (衝撃波・宇宙推進特別実験及

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose

To learn about shock waves, compressible fluid dynamics and space propulsion, and how to apply the related knowledge to practical problems.

●Prerequisite Subjects

Compressible fluid dynamics, Propulsion systems

●Course Topics

To conduct experiments and practices on shock waves and space propulsion.

●Textbook

Will be introduced in the class.

●Additional Reading

Akihiro Sasoh, "Compressible fluid dynamics and Shock Waves," Springer, 2020.

●Grade Assessment

Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty

Time window will be specified.

ments and Exercises in Propulsion Energy Systems Engineering A (1.0credits) (推進エネルギーシステム工学特別

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Improve the problem-solving capability from the viewpoint of propulsion energy systems engineering.

●Prerequisite Subjects

●Course Topics

Experiments and exercises to solve problems relevant to propulsion energy systems engineering.

●Textbook

●Additional Reading

●Grade Assessment

Depending on achievement

●Notes

●Contacting Faculty

ments and Exercises in Propulsion Energy Systems Engineering B (1.0credits) (推進エネルギーシステム工学特別

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Lecturer	Akira KAWASAKI Assistant Professor

●Course Purpose

Improve the problem-solving capability from the viewpoint of propulsion energy systems engineering.

●Prerequisite Subjects

●Course Topics

Experiments and exercises to solve problems relevant to propulsion energy systems engineering.

●Textbook

●Additional Reading

●Grade Assessment

Depending on achievement

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Structural Mechanics A (1.0credits) (構造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	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this experiment, students are intended to master the fundamental techniques of experiments and analyses used in the advanced material and structural technologies in the aerospace field.

The goal of this experiment is to master the fundamental techniques of the experiments and analyses, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Mechanics of Materials:Solid Mechanics:Applied Theory of Structural Mechanics:Vibration Engineering:Control Engineering:Fluid Mechanics

●Course Topics

Students will conduct fundamental experiments and analyses on structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As. Students must study and understand the test or analysis methods before the beginning of the class or experiment.

●Textbook

Not specified. Textbook will be specified by the beginning of the school year, if necessary.

●Additional Reading

Specified during the class or experiment, if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the class or experiment. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the class and experiments.

Advanced Experiments and Exercises in Structural Mechanics B (1.0credits) (構造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	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this experiment, students are intended to master the fundamental techniques of experiments and analyses used in the advanced material and structural technologies in the aerospace field.

The goal of this experiment is to master the fundamental techniques of the experiments and analyses, which can be applied in the R&Ds in the machine industrial field including aerospace industry.

●Prerequisite Subjects

Mechanics of Materials:Solid Mechanics:Applied Theory of Structural Mechanics:Vibration Engineering:Control Engineering:Fluid Mechanics

●Course Topics

Students will conduct fundamental experiments and analyses on structural and material technologies in the aerospace field. Students must teach the knowledge each other through the presentations and Q&As. Students must study and understand the test or analysis methods before the beginning of the class or experiment.

●Textbook

Not specified. Textbook will be specified by the beginning of the school year, if necessary.

●Additional Reading

Specified during the class or experiment, if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the class or experiment. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the undergraduate school:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the class and experiments.

Advanced Exercises and Experiments in Systems Control A (1.0credits) (制御システム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	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose

Cultivate capability of setting problems, seeking solutions, and planing research through experiments and exercises regarding students' own research themes related to control engineering.
Students will be able to present their themes in a convincing manner and carry out in-depth discussions about obtained results.

●Prerequisite Subjects

Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics

Students conduct experiments and exercises regarding their research themes related to control engineering. Presentation and discussion on the results are also required.

●Textbook

Not specified in advance due to variety of themes to be addressed in the class.

●Additional Reading

Specified during class if necessary.

●Grade Assessment

Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes

It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty

Accepted during class.

Advanced Exercises and Experiments in Systems Control B (1.0credits) (制御システム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	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer

●Course Purpose
Cultivate capability of setting problems, seeking solutions, and planing research through experiments and exercises regarding students' own research themes related to control engineering.
Students will be able to present their themes in a convincing manner and carry out in-depth discussions about obtained results.

●Prerequisite Subjects
Control engineering (classical and modern control theories), Mechanics (dynamics of rigid bodies and analytic mechanics), Calculus, Linear algebra, Theory of differential equations.

●Course Topics
Students conduct experiments and exercises regarding their research themes related to control engineering. Presentation and discussion on the results are also required.

●Textbook
Not specified in advance due to variety of themes to be addressed in the class.

●Additional Reading
Specified during class if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the contents of undergraduate control engineering lectures.

●Contacting Faculty
Accepted during class

Advanced Experiments and Exercises in Production Engineering A (1.0credits) (生産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	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

Students cultivate capabilities of research planning, technical presentations and discussions, and so on through carrying out precision machining, precision measurement, design of machine elements, process simulations, and so on.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

●Course Topics

Some topics are chosen from the following categories; precision machining, precision measurement, design of machine elements, simulations of manufacturing processes.The students work on the above topics.

●Textbook

●Additional Reading

Yusuf Altintas: ”Manufacturing AutomationMetal Cutting Mechanics, Machine Tool Vibrations, and CNC Design”, Cambridge University PressManufacturing Process and Equipment, George Tlusty, Prentice Hall

●Grade Assessment

Report or examination

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, shamoto@mech.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Advanced Experiments and Exercises in Production Engineering B (1.0credits) (生産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	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

Students cultivate capabilities of research planning, technical presentations and discussions, and so on through carrying out precision machining, precision measurement, design of machine elements, process simulations, and so on.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

●Course Topics

Some topics are chosen from the following categories; precision machining, precision measurement, design of machine elements, simulations of manufacturing processes.The students work on the above topics.

●Textbook

●Additional Reading

Yusuf Altintas: ”Manufacturing AutomationMetal Cutting Mechanics, Machine Tool Vibrations, and CNC Design”, Cambridge University PressManufacturing Process and Equipment, George Tlusty, Prentice Hall

●Grade Assessment

Report or examination

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.4491 takehiro.hayasaka@mae.nagoya-u.ac.jp

Exercises and Experiments in Aerospace Vehicle Dynamics A (1.0credits) (航空宇宙機運動システム工学特別実験

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Exercises and Experiments in Aerospace Vehicle Dynamics B (1.0credits) (航空宇宙機運動システム工学特別実験

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

No requirements to take this lecture.

●Contacting Faculty

Questions will be accepted after the lecture.

anced Exercises and Experiments in Advanced Composite Materials A (1.0credits) (先進複合材料特別実験及び演

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the application of the researches of advanced fiber reinforced plastics for a puropous of the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Examination, reports, etc.

●Notes

●Contacting Faculty

nced Exercises and Experiments in Advanced Composite Materials B (1.0credits) (先進複合材料特別実験及び演

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To understand the application of the researches of advanced fiber reinforced plastics for a puropous of the aerospace engineering.

●Prerequisite Subjects

Mechanics of Materials, Thermodynamics, Science and Engineering of composite Materials, Mechanics of Solid Materials, Solid State Physics

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, thermodynamics, and solid state physics, etc in order to understand the research of advanced composite materials for application of aerospace engineering.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Examination, reports, etc.

●Notes

●Contacting Faculty

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	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose
Students are expected to acquire comprehensive ability to apply fundamental knowledge through practical research work in industry.

●Prerequisite Subjects
Science subjects such as mathematics, physics and chemistry, and subjects in the field of mechanical and aerospace engineering

●Course Topics
Internships, i.e., practical experiences related to mechanical technology in industryOral presentation and written reports are imposed.

●Textbook
Not specified.

●Additional Reading
Not specified.

●Grade Assessment
Evaluation of comprehensive ability for practical problems by industry instructors, oral presentation, written reports, etc.Success criteria are the achievement of adequate reporting and Q & A.

●Notes
Take care the advance information.

●Contacting Faculty
It is accepted if students reserved time by email.

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	Aerospace Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose
Students are expected to acquire comprehensive ability to apply fundamental knowledge through practical research work in industry.

●Prerequisite Subjects
Science subjects such as mathematics, physics and chemistry, and subjects in the field of mechanical and aerospace engineering

●Course Topics
Internships, i.e., practical experiences related to mechanical technology in industryOral presentation and written reports are imposed.

●Textbook
Not specified.

●Additional Reading
Not specified.

●Grade Assessment
Evaluation of comprehensive ability for practical problems by industry instructors, oral presentation, written reports, etc.Success criteria are the achievement of adequate reporting and Q & A.

●Notes
Take care the advance information.

●Contacting Faculty
It is accepted if students reserved time by email.

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.

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.

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.

Seminar on Structural Mechanics 2A (2.0credits) (構造力学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the fundamental knowledge about related technologies needed to conduct the specialized research in the advanced material and structural technologies in the aerospace field.

The goal of this seminar is to get the fundamental knowledge of related technologies which can be applied to the specialized research in the advanced material and structural technologies in the aerospace field.

●Prerequisite Subjects

Seminar on Structural Mechanics 1A, 1B, 1C, and 1D, Aerospace Structures

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field, or associated field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the master course:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 2B (2.0credits) (構造力学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the fundamental knowledge about related technologies needed to conduct the specialized research in the advanced material and structural technologies in the aerospace field.

The goal of this seminar is to get the fundamental knowledge of related technologies which can be applied to the specialized research in the advanced material and structural technologies in the aerospace field.

●Prerequisite Subjects

Seminar on Structural Mechanics 1A, 1B, 1C, and 1D, Aerospace Structures

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field, or associated field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the master course:
Mechanics of materials,
Material sciences, and
Solid mechanics.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 2C (2.0credits) (構造力学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the deeper knowledge about related technologies needed to conduct the specialized research in the advanced material and structural technologies in the aerospace field.

The goal of this seminar is to get the deeper knowledge of related technologies which can be applied to the specialized research in the advanced material and structural technologies in the aerospace field.

●Prerequisite Subjects

Seminar on Structural Mechanics 1A, 1B, 1C, and 1D, Aerospace Structures

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field, or associated field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the master course:
Mechanics of materials,
Material sciences, and
Solid mechanics.
It is desirable that students have got the credits of the following seminars:
Seminar on Structural Mechanics 2-A and 2-B.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 2D (2.0credits) (構造力学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the deeper knowledge about related technologies needed to conduct the specialized research in the advanced material and structural technologies in the aerospace field.

The goal of this seminar is to get the deeper knowledge of related technologies which can be applied to the specialized research in the advanced material and structural technologies in the aerospace field.

●Prerequisite Subjects

Seminar on Structural Mechanics 1A, 1B, 1C, and 1D, Aerospace Structures

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field, or associated field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the master course:
Mechanics of materials,
Material sciences, and
Solid mechanics.
It is desirable that students have got the credits of the following seminars:
Seminar on Structural Mechanics 2-A and 2-B.

●Contacting Faculty

Accepted during the seminar.

Seminar on Structural Mechanics 2E (2.0credits) (構造力学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Masahiro Arai Professor	Akinori YOSHIMURA Associate Professor	Keita GOTO Assistant Professor

●Course Purpose

Aerospace technology is an integration of many technologies. Among them, material and structural technologies have very important roles. Through this seminar, students are intended to get the specialized knowledge about related technologies needed to write the doctoral thesis about the advanced material and structural technologies in the aerospace field.

The goal of this seminar is to get the specialized knowledge of related technologies which can be applied to the specialized research in the advanced material and structural technologies in the aerospace field.

●Prerequisite Subjects

Seminar on Structural Mechanics 1A, 1B, 1C, and 1D, Aerospace Structures

●Course Topics

Students will read intensively the specialized book and will survey the published research papers about structural and material technologies in the aerospace field, or associated field. Students must teach the knowledge each other through the presentations and Q&As.
Students must read the textbook or papers before the beginning of each seminar.

●Textbook

Textbook or papers are selected by the beginning of the school year.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Students will be evaluated on the basis of presentation and Questions-and-Answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

It is desirable that students have studied following topics in the master course:
Mechanics of materials,
Material sciences, and
Solid mechanics.
It is desirable that students have got the credits of the following seminars:
Seminar on Structural Mechanics 2-A, 2-B, 2-C, and 2-D.

●Contacting Faculty

Accepted during the seminar.

Seminar on Control Systems Engineering 2A (2.0credits) (制御システム工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer	KikukoMIYATA Assistant Professor

●Course Purpose
The objective of this seminar is to deepen students' understanding of advanced methods of control systems design through research on recent control problems in aerospace engineering and related fields.
Students will be able to understand the characteristics of advanced design methods and apply them to actual control problems.

●Prerequisite Subjects
Control engineering (classical, modern, nonlinear, post-modern control theories), Modern analysis

●Course Topics
Students conduct surveys and research on advanced topics in control engineering. Presentation and discussion on the results are also required.

●Textbook
Announced in the seminar because students are supposed to deal with a various themes.

●Additional Reading
Specified during the seminar if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the basics of graduate-level control engineering.

●Contacting Faculty
Accepted during the seminar.

Seminar on Control Systems Engineering 2B (2.0credits) (制御システム工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer	KikukoMIYATA Assistant Professor

●Course Purpose

The objective of this seminar is to deepen students' understanding of advanced methods of control systems design through research on recent control problems in aerospace engineering and related fields.
Students will be able to understand the characteristics of advanced design methods and apply them to actual control problems.

●Prerequisite Subjects

Control engineering (classical, modern, nonlinear, post-modern control theories), Modern analysis

●Course Topics

Students conduct surveys and research on advanced topics in control engineering. Presentation and discussion on the results are also required.

●Textbook

Announced in the seminar because students are supposed to deal with a various themes.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes

It is desirable that students understand the basics of graduate-level control engineering.

●Contacting Faculty

Accepted during the seminar.

Seminar on Control Systems Engineering 2C (2.0credits) (制御システム工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer	KikukoMIYATA Assistant Professor

●Course Purpose
The objective of this seminar is to deepen students' understanding of advanced methods of control systems design through research on recent control problems in aerospace engineering and related fields.
Students will be able to understand the characteristics of advanced design methods and apply them to actual control problems.

●Prerequisite Subjects
Control engineering (classical, modern, nonlinear, post-modern control theories), Modern analysis

●Course Topics
Students conduct surveys and research on advanced topics in control engineering. Presentation and discussion on the results are also required.

●Textbook
Announced in the seminar because students are supposed to deal with a various themes.

●Additional Reading
Specified during the seminar if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the basics of graduate-level control engineering.

●Contacting Faculty
Accepted during the seminar.

Seminar on Control Systems Engineering 2D (2.0credits) (制御システム工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer	KikukoMIYATA Assistant Professor

●Course Purpose
The objective of this seminar is to deepen students' understanding of advanced methods of control systems design through research on recent control problems in aerospace engineering and related fields.
Students will be able to understand the characteristics of advanced design methods and apply them to actual control problems.

●Prerequisite Subjects
Control engineering (classical, modern, nonlinear, post-modern control theories), Modern analysis

●Course Topics
Students conduct surveys and research on advanced topics in control engineering. Presentation and discussion on the results are also required.

●Textbook
Announced in the seminar because students are supposed to deal with a various themes.

●Additional Reading
Specified during the seminar if necessary.

●Grade Assessment
Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes
It is desirable that students understand the basics of graduate-level control engineering.

●Contacting Faculty
Accepted during the seminar.

Seminar on Control Systems Engineering 2E (2.0credits) (制御システム工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Susumu HARA Professor	Daisuke TSUBAKINO Lecturer	KikukoMIYATA Assistant Professor

●Course Purpose

The objective of this seminar is to deepen students' understanding of advanced methods of control systems design through research on recent control problems in aerospace engineering and related fields.
Students will be able to understand the characteristics of advanced design methods and apply them to actual control problems.

●Prerequisite Subjects

Control engineering (classical, modern, nonlinear, post-modern control theories), Modern analysis

●Course Topics

Students conduct surveys and research on advanced topics in control engineering. Presentation and discussion on the results are also required.

●Textbook

Announced in the seminar because students are supposed to deal with a various themes.

●Additional Reading

Specified during the seminar if necessary.

●Grade Assessment

Presentation and participation to discussions.
Pass level of achievement: 60% or more.

●Notes

It is desirable that students understand the basics of graduate-level control engineering.

●Contacting Faculty

Accepted during the seminar.

Seminar on Fluid Dynamics 2A (2.0credits) (流体力学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective: To study experimental fluid dynamics related with aerospace engineering

●Prerequisite Subjects

1. Incompressible Fluid Dynamics
2. Voscous Fluid Dynamics
3. Compressible Fluid Dynamics

●Course Topics

1. Wind tunnels
2. Velocity measurement by Pitot tube
3. Hot wire anemometry
4. Force measurements by sting balance
5. Visualization methods
6. Pressure measument by pressure transducer
7. PSP and TSP
8. Aeroacoustic sound measurement

●Textbook

Handout

●Additional Reading

No specific

●Grade Assessment

Presentation regarding the part in charge

●Notes

No need

●Contacting Faculty

At any time

Seminar on Fluid Dynamics 2B (2.0credits) (流体力学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose
Objective: To Study applications of Computational Fluid Dynamics related with aerospace engineering

●Prerequisite Subjects
Advanced Computational Fluid Dynamics

●Course Topics
1. Grid generation around complicated shape
2. Numerical schemes for practical use
3. Resolution
4. Stability
5. Computational time
6. Visualization

●Textbook
Handout

●Additional Reading
No specific

●Grade Assessment
Presentation regarding the part in charge

●Notes
Nothing

●Contacting Faculty
At any time

Seminar on Fluid Dynamics 2C (2.0credits) (流体力学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective : To study transonic aerodynamics related with aerospace engineering

●Prerequisite Subjects

1. Viscous fluid dynamics
2. Compressible fluid dynamics

●Course Topics

1. Fundamentals of transonic flow
2. The governing equations for potential flows
3. Supercritical wing
4. Interaction of shock wave with boundary layer
5. Buffeting
6. Flutter
7. Base flow

●Textbook

Handout

●Additional Reading

No specific

●Grade Assessment

Presentation regarding the part in charge

●Notes

Nothing

●Contacting Faculty

At any time

Seminar on Fluid Dynamics 2D (2.0credits) (流体力学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective: To study supersonic aerodynamics related with aerospace engineering

●Prerequisite Subjects

1. Viscous fluid dynamics
2. Compressible fluid dynamics

●Course Topics

1. Fundamentals of supersonic flow
2. Characteristics theory
3. Shock wave
4. Slender body theory
5. Supersonic wing theory
6. Sonic boom

●Textbook

Handout

●Additional Reading

No specific

●Grade Assessment

Presentation regarding the part in charge

●Notes

Nothing

●Contacting Faculty

At any time

Seminar on Fluid Dynamics 2E (2.0credits) (流体力学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Kouji NAGATA Professor	Koichi MORI Associate Professor	Tomoaki WATANABE Assistant Professor

●Course Purpose

Objective: To study hypersonic aerodynamics related with aerospace engineering

●Prerequisite Subjects

1. Viscous fluid dynamics
2. Compressible fluid dynamics

●Course Topics

1. Fundamentals of hypersonic flow
2. Similarity of hypersonic flow
3. Hypersonic aerodynamics
4. Newtonian approximation
5. Aerodynamic heating
6. Non-equilibrium of internal energy
7. Shock/shock interaction
8. Rarefied gas flow

●Textbook

Handout

●Additional Reading

No specific

●Grade Assessment

Presentation regarding the part in charge

●Notes

Nothing

●Contacting Faculty

At any time

Seminar on Shock Wave and Space Propulsion 2A (2.0credits) (衝撃波・宇宙推進セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 2B (2.0credits) (衝撃波・宇宙推進セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified

Seminar on Shock Wave and Space Propulsion 2C (2.0credits) (衝撃波・宇宙推進セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 2D (2.0credits) (衝撃波・宇宙推進セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Akihiro SASOH Professor	Kiyoshi KINEFUCHI Associate Professor	DAISUKE Ichihara Assistant Professor
	Yusuke NAKAMURA Designated Assistant Professor		

●Course Purpose
Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects
compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics
Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook
Will be introduced in the class.

●Additional Reading
Will be introduced in the class.

●Grade Assessment
Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty
Time window will be specified.

Seminar on Shock Wave and Space Propulsion 2E (2.0credits) (衝撃波・宇宙推進セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Akihiro SASOH Professor	DAISUKE Ichihara Assistant Professor	Yusuke NAKAMURA Designated Assistant Professor
	Kiyoshi KINEFUCHI Associate Professor		

●Course Purpose

Fundamental knowledges of compressible fluid dynamics, plasma physics, molecular and atomic physics, and spectroscopy are acquired.

●Prerequisite Subjects

compressible fluid dynamics, thermophysics, electromagnetism

●Course Topics

Various textbooks are chosen every year. The seminar includes presentation, discussions, and exercises.

●Textbook

Will be introduced in the class.

●Additional Reading

Will be introduced in the class.

●Grade Assessment

Presentation (50 points) & Discussion (50 points)To pass, students must earn at least 60 points out of 100.

●Notes

●Contacting Faculty

Time window will be specified.

Seminar on Propulsion Energy Systems Engineering 2A (2.0credits) (推進エネルギーシステム工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Assistant Professor	Akira KAWASAKI Assistant Professor

●Course Purpose

Level up your own research ability for your developing advanced propulsin energy systems

●Prerequisite Subjects

●Course Topics

Review and discuss current energy system problems to be resolved

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 2B (2.0credits) (推進エネルギーシステム工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Assistant Professor	Akira KAWASAKI Assistant Professor

●Course Purpose

Level up your own research ability for your developing advanced propulsion energy systems

●Prerequisite Subjects

●Course Topics

Review and discuss current propulsion system problems to be resolved

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 2C (2.0credits) (推進エネルギーシステム工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Assistant Professor	Akira KAWASAKI Assistant Professor

●Course Purpose

Level up your own research ability for your developing advanced thermal controltechnology

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 2D (2.0credits) (推進エネルギーシステム工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Assistant Professor	Akira KAWASAKI Assistant Professor

●Course Purpose

Level up your own research ability for your developing advanced propulsion energy systems

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Propulsion Energy Systems Engineering 2E (2.0credits) (推進エネルギーシステム工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Jiro KASAHARA Professor	Ken Matsuoka Assistant Professor	Akira KAWASAKI Assistant Professor

●Course Purpose

Level up your own research ability for your developing advanced propulsion energy systems

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Production Engineering 2A (2.0credits) (生産工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to cultivate capabilities to find new research and development themes, to propose/develop novel methods/devices, and to summarize the results in the field of production engineering.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn how to make a progress in production engineering such as machining, machine tool, control, measurement and simulation through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 2B (2.0credits) (生産工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to cultivate capabilities to find new research and development themes, to propose/develop novel methods/devices, and to summarize the results in the field of production engineering.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn how to make a progress in production engineering such as machining, machine tool, control, measurement and simulation through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 2C (2.0credits) (生産工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to cultivate capabilities to find new research and development themes, to propose/develop novel methods/devices, and to summarize the results in the field of production engineering.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn how to make a progress in production engineering such as machining, machine tool, control, measurement and simulation through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 2D (2.0credits) (生産工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to cultivate capabilities to find new research and development themes, to propose/develop novel methods/devices, and to summarize the results in the field of production engineering.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn how to make a progress in production engineering such as machining, machine tool, control, measurement and simulation through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jpp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Production Engineering 2E (2.0credits) (生産工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Eiji SHAMOTO Professor	Takashi NAKAMURA Endowed Chair	Norikazu SUZUKI Associate Professor
	Takehiro HAYASAKA Assistant Professor		

●Course Purpose

The aim of this seminar is to cultivate capabilities to find new research and development themes, to propose/develop novel methods/devices, and to summarize the results in the field of production engineering.The goal of this course is to be able to conduct them in practice.

●Prerequisite Subjects

Precision machining, Aerospace manufacturing, Manufacturing system, Machine tool engineering

●Course Topics

Students learn how to make a progress in production engineering such as machining, machine tool, control, measurement and simulation through their surveys, presentations, and discussions.The students are required to prepare the surveys and the presentations before this seminar.

●Textbook

●Additional Reading

Reference books, papers, and other articles are selected at seminar.

●Grade Assessment

●Notes

●Contacting Faculty

Eiji Shamoto (Ext.2705, eiji.shamoto@mae.nagoya-u.ac.jp)Takashi Nakamura (Ext.2708, takashi.nakamura@mae.nagoya-u.ac.jp)Norikazu SuzukiExt.4491 nsuzuki@mech.nagoya-u.ac.jpTakehiro HayasakaExt.5305 takehiro.hayasaka@mae.nagoya-u.ac.jp

Seminar on Aerospace Vehicle Dynamics 2A (2.0credits) (航空宇宙機運動システム工学セミナー2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

No requirements to take this lecture.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 2B (2.0credits) (航空宇宙機運動システム工学セミナー2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 2C (2.0credits) (航空宇宙機運動システム工学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 2D (2.0credits) (航空宇宙機運動システム工学セミナー2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Aerospace Vehicle Dynamics 2E (2.0credits) (航空宇宙機運動システム工学セミナー2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Aerospace Engineering		
Starts 1	3 Spring Semester		
Lecturer	Shigeru SUNADA Professor	Takaya INAMORI Associate Professor	Kohei YAMAGUCHI Assistant Professor

●Course Purpose

Reading textbooks and papers necessary for the research of aerospace vehicle dynamics, learning theoretical and numerical analysis techniques, and understanding research trends in related fields.Achievements:1. Understand and explain the basics of aerospace mechanics.2. Understand and perform mathematical methods to analyze aerospace vehicles dynamics.3. Understand the numerical analysis method of aerospace vehicles.4. Present research results in papers and presentations.

●Prerequisite Subjects

Dynamics I, Dynamics II, Aerospace vehicle dynamics I, Aerospace vehicle dynamics II, Advanced Lectures on Aircraft Systems, Advanced Lectures on Spacecraft Systems.

●Course Topics

1. Basics of rigid body dynamics2. Dynamics and modeling of aerospace vehicles3. Numerical calculations and experiments4. Presentations and papers5. Final presentationIn the lecture, students will present their research-related studies in a report.Before the lecture, students must read specified papers and books to prepare for their presentations. After the lecture, students must revise their reports and presentations based on comments in the lecture and submit the revised materials.

●Textbook

Related materials will be distributed in this lecture.

●Additional Reading

Peter C. Hughes , Spacecraft Attitude Dynamics, 2004.James R. Wertz and Wiley J. Larson, Space Mission Analysis and Design (SMAD) - 3rd Ed, 1999. Wertz, James R. Spacecraft Attitude Determination and Control, 1978.

●Grade Assessment

The level of achievements is evaluated through reports. For credit, students must achieve the level to deal with elementary problems correctly in the report. At least 80% attendance is also required.

●Notes

The course has no specific prerequisites.

●Contacting Faculty

Questions will be accepted after the lecture.

Seminar on Advanced Composite Materials 2A (2.0credits) (先進複合材料セミナー2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To study the field of the researches of advanced fiber reinforced plastics for application of the aerospace engineering and the related field.

●Prerequisite Subjects

Seminar of Advanced Composite Materials 1A, 1B, 1C, and 1D: Aerospace Structures: Advanced Lectures on Applied Structure

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, and the relation with thermodynamics, and solid state physics, etc. We also study the application of the advanced composite materials for aerospace engineering and the related field.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 2B (2.0credits) (先進複合材料セミナー2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To study the field of the researches of advanced fiber reinforced plastics for application of the aerospace engineering and the related field.

●Prerequisite Subjects

Seminar of Advanced Composite Materials 1A, 1B, 1C, and 1D: Aerospace Structures: Advanced Lectures on Applied Structure

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, and the relation with thermodynamics, and solid state physics, etc. We also study the application of the advanced composite materials for aerospace engineering and the related field.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 2C (2.0credits) (先進複合材料セミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To study the field of the researches of advanced fiber reinforced plastics for application of the aerospace engineering and the related field.

●Prerequisite Subjects

Seminar of Advanced Composite Materials 1A, 1B, 1C, and 1D: Aerospace Structures: Advanced Lectures on Applied Structure

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, and the relation with thermodynamics, and solid state physics, etc. We also study the application of the advanced composite materials for aerospace engineering and the related field.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the bigining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 2D (2.0credits) (先進複合材料セミナー2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To study the field of the researches of advanced fiber reinforced plastics for application of the aerospace engineering and the related field.

●Prerequisite Subjects

Seminar of Advanced Composite Materials 1A, 1B, 1C, and 1D: Aerospace Structures: Advanced Lectures on Applied Structure

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, and the relation with thermodynamics, and solid state physics, etc. We also study the application of the advanced composite materials for aerospace engineering and the related field.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

Seminar on Advanced Composite Materials 2E (2.0credits) (先進複合材料セミナー2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Aerospace Engineering	
Starts 1	3 Spring Semester	
Lecturer	Atsuhiko YAMANAKA Professor	Makoto ICHIKI Assistant Professor

●Course Purpose

To study the field of the researches of advanced fiber reinforced plastics for application of the aerospace engineering and the related field.

●Prerequisite Subjects

Seminar of Advanced Composite Materials 1A, 1B, 1C, and 1D: Aerospace Structures: Advanced Lectures on Applied Structure

●Course Topics

We study the mechanics of materials, material science and engineering, enginerring of composite materials, and the relation with thermodynamics, and solid state physics, etc. We also study the application of the advanced composite materials for aerospace engineering and the related field.

●Textbook

Textbook of the seminar is selected by the begining of the school year.

●Additional Reading

References are selected by the begining of the school year.

●Grade Assessment

Students will be evaluated on the basis of presentation and questions - and - answers at the seminar. They must score no less than 60 points out of 100 points to get credit.

●Notes

●Contacting Faculty

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