Fundamentals of Biomolecular Chemistry (2.0credits) (分子生命化学基礎論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor	Hiroshi MURAKAMI Professor
	HAYASHI Gosuke Associate Professor	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor
	Yukiko KAMIYA Associate Professor		

●Course Purpose

This course aims to help students acquire an understanding of basic knowledge and application about nanobio analytical chemistry, chemical biotechnology, and supramolecular biochemistry. This course introduces methodology relating to measurements and evaluation of substances from various points of view.

●Prerequisite Subjects

basic class of department of biomolecular engineering

●Course Topics

1. Nanobio analytical chemistry
2. Chemical biotechnology
3. Supuramolecular biochemistry

●Textbook

no textbook, handouts as necessary

●Additional Reading

●Grade Assessment

Your overall grade in the class will be decided based on the following:
- Attendance: 30%
- Report: 70%

●Notes

●Contacting Faculty

You may contact the teacher after his/her lecture.
Otherwise you may contact us by email.

Fundamentals of Biosystem Engineering (2.0credits) (生命システム工学基礎論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	KIYONAKA Shigeki Professor	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor
	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer

●Course Purpose

The purpose of this course is to analyze recent topics in Biosystems engineering fields from the basic and applied aspects and to discuss future developments from a engineer's standpoint.
By learning this lecture, the goal is to be able to:
1. Learn and explain recent topics in basics and applications in the field of biosystems engineering.
2. Give an opinion on the future development of this field based on sufficient awareness of the current situation.

●Prerequisite Subjects

Biochemistry with exercises 1-4, Biochemistry 5.
Fundamentals of Chemical Engineering.
Bioreaction Engineering.
Biological data science and engineering.

●Course Topics

1. Topics in drug development and regenerative medicine.
2. Topics in microbiology and applied microbiology.
3. Topics in chemical biology fields.

●Textbook

Text book will be introduced in the class.

●Additional Reading

Biochemistry, D. Voet & J. G. Voet, 4th Edition.
Biochemsiry, J.M. Berg, L. Stryer, J.L. Tymoczko & G.L. Gatto, 8th Edition.

●Grade Assessment

The score will be evaluated by presentation, report and discussion.

●Notes

●Contacting Faculty

Contact with the faculties at the class room or by email.
Shimizu: shimizu(at)chembio.nagoya-u.ac.jp
Nakatani: nakatanih(at)chembio.nagoya-u.ac.jp
Kiyonaka: kiyonaka(at)chembio.nagoya-u.ac.jp

Fundamentals of Moleuclar and Macromolecular Chemistry (2.0credits) (有機・高分子化学基礎論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	1 Spring Semester	1 Spring Semester	1 Spring Semester
Lecturer	Eiji YASHIMA Professor	MasamiKAMIGAITO Professor	Kazuaki ISHIHARA Professor
	Takashi OOI Professor	Hiroshi SHINOKUBO Professor	MakotoYAMASHITA Professor
	Atsushi TAKANO Associate Professor	Yukikazu Takeoka Associate Professor	UYANIK Muhammet Associate Professor
	Tomoyuki IKAI Associate Professor	Kosuke OMATSU Designated Associate Professor	Atsushi NORO Lecturer
	Mineto UCHIYAMA Lecturer		

●Course Purpose

We study fundamental topics related to organic chemistry and macromolecular chemistry including organic material chemistry, organoelement Chemistry, organic reactions, catalysis in organic synthesis, physical chemistry of polymers, organic chemistry of macromolecules, macromolecular assembly systems, and supramolecular polymer chemistry. The purpose of this lecture is to understand fundamental topic in organic and macromolecular chemistry for learning advanced chemistry, and to gain applied, comprehensive, bird's-eye view skills.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Fundamentals of Physical Chemistry (2.0credits) (物理化学基礎論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	Atsushi Satsuma Professor	Tsukasa TORIMOTO Professor	Koichi KIKUTA Professor
	Jun KUMAGAI Associate Professor	TatsuyaKAMEYAMA Associate Professor	Kyoichi SAWABE Lecturer

●Course Purpose

This lecture aims to be a researcher/engineer who can create and drive the next generation of "engineering and technology", and combines expertise as well as comprehensiveness with an international perspective. In the lectures, we will improve our basic knowledge in physical chemistry. The course is aimed to understand the principle and to attain the applicability of thermodynamics, chemical reaction kinetics, quantum chemistry, etc. which are necessary in various fields as the basis of Physical Chemistry.

●Prerequisite Subjects

Thermodynamics, quantum chemistry, chemical kinetics, structural chemistry, electrochemistry, catalysis/surface chemistry, inorganic and physical chemistry exercises, photochemistry, radiation chemistry, polymer physical chemistry

●Course Topics

This is an omnibus-style class including the following contents in the field of graduate-level physical chemistry related to thermodynamics, chemical reactions, and quantum mechanics.
1. Mechanism and surface of catalytic reaction, various catalysts
2. Industrial use of catalysts
3. Basics of statistical mechanics
4. Molecular Dynamics Method II
5. Quantum chemical calculations
6. Basics of Electrochemistry and Photoelectrochemistry
7. Design and application of nanomaterials
8 Light absorption and emission by organic molecules
9 Characteristics and mechanism of photochemical reaction
10. Photochemical reaction and material chemistry
Prepare for the next class and understand the meaning of technical terms.

●Textbook

In case of necessity, printed handouts will be distributed in each lecture.

●Additional Reading

Textbooks and papers are designated for each week.

●Grade Assessment

Credits will be awarded to those students who score 60 or more based on the evaluation of academic achievements. The academic achievement is evaluated by examination, report, quiz or by their combination. A correct understanding of the basic concepts and terms related to physical chemistry is the criterion for passing.

●Notes

No special requirement.
Classes will be conducted both face-to-face and remotely.
Ask questions to the teacher via NUCT message.

●Contacting Faculty

Do not hesitate to ask any questions during the class, or to have an appointment with each lecturer by e-mail.
satsuma@chembio.nagoya-u.ac.jp(Satsuma)
torimoto@chembio.nagoya-u.ac.jp(Torimoto)
kik@chembio.nagoya-u.ac.jp(Kikuta)
w.shinoda@chembio.nagoya-u.ac.jpShinoda
kumagai@chembio.nagoya-u.ac.jpKumagai
sawabe@chembio.nagoya-u.ac.jpSawabe

Fundamentals of Solide State Chemistry (2.0credits) (固体化学基礎論)

Course Type	Basic Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	Spring Semester ,every other year	Spring Semester ,every other year	Spring Semester ,every other year
Lecturer	Ryoutarou MATSUDA Professor	Chikara OHTUKI Professor	OSADA Minoru Professor
	NAKANISHI Kazuki Professor	KOBAYASHI Makoto Associate Professor	Joji HASEGAWA Designated Associate Professor
	SEN Susan Designated Associate Professor	Hiroaki IGUCHI Associate Professor	

●Course Purpose

The purpose of this course is to understand important contents of solid-state chemistry including inorganic chemistry, coordination chemistry, structural chemistry, inorganic material chemistry, and crystallography, in order to acquire the ability to develop new materials and substances that support a sustainable society.

In this course, the cutting-edge researchers will provide basic to the latest topics on energy-related materials, inorganic-organic hybrid materials, nanostructured materials, and biomaterials so that students will deepen understanding of these areas.

By the end of this course, students will be able to design new materials with a flexible idea, taking a bird's-eye view of the functions that solid materials manifest.

●Prerequisite Subjects

Fundamental Chemistry I, Fundamental Chemistry II, Inorganic Chemistry 1 with Exercises, Inorganic Chemistry 2 with Exercises, Chemistry of Inorganic Reaction (Inorganic Chemistry 3), and Inorganic Material Chemistry (Inorganic Chemistry 4), Analytical Chemistry 1 with Exercises, Analytical Chemistry 2 with Exercises, Analytical Chemistry 3, Physical Chemistry 1 with Exercises (Chemical Kinetics with Exercises), Physical Chemistry 2 with Exercises (Thermodynamics 1 with Exercises), Physical Chemistry 3 with Exercises (Quantum Chemistry 1 with Exercises), Physical Chemistry 4 with Exercises (Thermodynamics 2 with Exercises), Physical Chemistry 5 with Exercises (Quantum Chemistry 2 with Exercises), Physical Chemistry 6 (Energy and Theoretical Chemistry)

●Course Topics

Each faculty will give lectures in the omnibus style on solid-state chemistry, including inorganic chemistry, complex chemistry, structural chemistry, inorganic material chemistry, and crystallography. The topics include followings.

1. Energy-related (storage, conversion, etc.) materials
2. Inorganic-organic materials
3. Nanostructured materials
4. Nanoparticles
5. Biomaterials
6. Porous materials

Examinations or reports will be assigned after the classes.
References such as scientific papers will be provided in the classes for further reading.

●Textbook

Textbooks are not designated. Prints are distributed when necessary.

●Additional Reading

A. R. West: Solid State Chemistry, WILEY
William D. Callister Jr.: Materials Science and Engineering, Wiley

●Grade Assessment

Students should understand important contents of solid-state chemistry. The evaluation is performed by examinations and reports. Credits will be awarded to those students who score 60 or more.
Grades are as follows:
<Enrollees after 2020>
A+: 100-95, A: 94-80, B: 79-70, C: 69-65, C-: 64-60, F: 59-0.
<Enrollees before 2019>
S: 100-90, A: 89-80, B: 79-70, C: 69-60, F: 59-0.

●Notes

In 2022, on-site lecture will be given.

●Contacting Faculty

Questions outside the hours are accepted in the lecture room or teachers' room after the class. Otherwise, contact the professors by e-mail in advance.

Prof. Ryotaro Matsuda (ryotaro.matsuda[at]chembio.nagoya-u.ac.jp)
Prof. Chikara Ohtsuki (ohtsuki[at]chembio.nagoya-u.ac.jp)
Prof. Minoru Osada (mosada[at]imass.nagoya-u.ac.jp)
Prof. Kazuki Nakanishi (dknakanishi[at]imass.nagoya-u.ac.jp)
Assoc. Prof. George Hasegawa (h-george[at]imass.nagoya-u.ac.jp)
Assoc. Prof. Hiroaki Iguchi (hiroaki.iguchi[at]chembio.nagoya-u.ac.jp)
Assoc. Prof. Makoto Kobayashi (mkoba[at]imass.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 1A (2.0credits) (分子生命化学セミナー 1A)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1A (2.0credits) (分子生命化学セミナー 1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 1A (2.0credits) (分子生命化学セミナー 1A)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1B (2.0credits) (分子生命化学セミナー 1B)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1B (2.0credits) (分子生命化学セミナー 1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 1B (2.0credits) (分子生命化学セミナー 1B)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1C (2.0credits) (分子生命化学セミナー 1C)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1C (2.0credits) (分子生命化学セミナー 1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

N/A

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 1C (2.0credits) (分子生命化学セミナー 1C)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1D (2.0credits) (分子生命化学セミナー 1D)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 1D (2.0credits) (分子生命化学セミナー 1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 1D (2.0credits) (分子生命化学セミナー 1D)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 1A (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire basic knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
Review literature and collect data according to weekly guidance.

●Prerequisite Subjects

Biochemstry 1-5

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation, oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 1A (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 1A (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students learn how to refer and read articles to obtain information on research. Students introduce the contents of the articles and respond to questions. Students present background of their research themes and report their progress. Goal 1. Students can obtain important references. 2. Students can understand the contents of the articles and explain them to others. 3. Students can explain results of their research to others. 4. Students acquire skill for presentation. 5. Students properly answer to questions at presentation.

●Prerequisite Subjects

Lectures in the Department of Biotechnology

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

"Seikagakujiten" Tokyo KagakudojinTextbooks used in undergraduate students

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 1B (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire basic knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
Review literature and collect data according to weekly guidance.

●Prerequisite Subjects

Biochemstry 1-5

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 1B (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 1B (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students learn how to refer and read articles to obtain information on research. Students introduce the contents of the articles and respond to questions. Students present background of their research themes and report their progress. Goal 1. Students can obtain important references. 2. Students can understand the contents of the articles and explain them to others. 3. Students can explain results of their research to others. 4. Students acquire skill for presentation. 5. Students properly answer to questions at presentation.

●Prerequisite Subjects

Seminar on Biosystem Engineering 1A

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

"Seikagakujiten" Tokyo Kagakudojin

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 1C (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire basic knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
Review literature and collect data according to weekly guidance.

●Prerequisite Subjects

Biochemstry 1-5

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 1C (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 1C (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students learn how to refer and read articles to obtain information on research. Students introduce the contents of the articles and respond to questions. Students present background of their research themes and report their progress. Goal 1. Students can obtain important references. 2. Students can understand the contents of the articles and explain them to others. 3. Students can explain results of their research to others. 4. Students acquire skill for presentation. 5. Students properly answer to questions at presentation.

●Prerequisite Subjects

Seminar on Biosystem Engineering (1A, 1B)

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

"Seikagakujiten" Tokyo Kagakudojin

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 1D (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire basic knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
Review literature and collect data according to weekly guidance.

●Prerequisite Subjects

Biochemstry 1-5

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 1D (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 1D (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students learn how to refer and read articles to obtain information on research. Students introduce the contents of the articles and respond to questions. Students present background of their research themes and report their progress. Goal 1. Students can obtain important references. 2. Students can understand the contents of the articles and explain them to others. 3. Students can explain results of their research to others. 4. Students acquire skill for presentation. 5. Students properly answer to questions at presentation.

●Prerequisite Subjects

Seminar on Biosystem Engineering (1A, 1B, 1C)

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

"Seikagakujiten" Tokyo Kagakudojin

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

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

●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

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

Nanobio Analytical Chemistry (2.0credits) (ナノバイオ計測化学)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Biomolecular Engineering	
Starts 1	Spring Semester ,every other year	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

To understand the fundamentals of spectroscopy and separation science, which are the basis of nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, as well as the state-of-the-art analytical methods based on them.
Objectives:
1. To be able to explain the principles and applications of various spectroscopic and separation methods.
2. To be able to explain the most advanced analytical methods.
3. To be able to comprehensively propose analytical methods for actual samples using these methods.

●Prerequisite Subjects

●Course Topics

1. Spectroscopic analysis methods
Students will learn about state-of-the-art measurement methods such as ultra-sensitive spectroscopy and super-resolution microscopy.
2. Separation methods
Students will learn about separation methods based on semiconductor technology and separation methods using nano-materials. 3.
3. single molecule analysis method
Students will learn about single molecule measurement methods using micro/nano channels and single particle analysis methods.

Assignments related to the lecture content will be given after the lecture and will be submitted as a report at the next time.

●Textbook

●Additional Reading

●Grade Assessment

Evaluation will be made on each report assignment.
The minimum passing criterion for each report is a correct understanding and discussion of the characteristics and technical issues of nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry. Each report is evaluated individually, and a score of 60 or higher on a 100-point scale is considered a passing grade.

●Notes

●Contacting Faculty

Chemical Biotechnology (2.0credits) (生体分子応用化学)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Biomolecular Engineering	
Starts 1	Autumn Semester ,every other year	
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor

●Course Purpose

This course introduces students to advanced biochemical techniques:ex. RNA engineering, protein engineering, directed evolution, synthetic biology, nucleic acids chemistry, peptide chemistry, protein chemistry, and epigenetics.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Nucleic acid chemistryYou will learn in vitro selection of DNA/RNA aptamers, synthetic nucleic acid chemistry, detection and imaging of modified DNA/RNA, DNA epigenetics.2. Protein chemistryYou will learn in vitro selection of proteins, genetic code engineering, synthetic biology, synthetic peptide/protein chemistry, detection of protein modification, and epigenetics.

●Textbook

●Additional Reading

Molecular Biology of the Gene,James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard LosickISBN-10: 080539592XISBN-13: 978-0805395921

●Grade Assessment

Your final grade will be calculated according to the following process: Usual performance score 50%, Reports 50%.

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Supramolecular Biochemistry (2.0credits) (生命超分子化学)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Biomolecular Engineering		
Starts 1	Spring Semester ,every other year		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor

●Course Purpose

Students will study properties and functions of oligonucleotides from the view points of photochemistry and supramolecular chemistry. Lectures are especially focused on the photochemical properties of oligonucleotides as molecular assemblies.

●Prerequisite Subjects

Quantum Chemistry 1 with Exercises
Biochemistry 1 with Exercises

●Course Topics

1. Basic chemistry of nucleic acids and stucutre of DNA duplex
2. Quantum chemical interpretation of photo-excitation
3. Photochemcial property of assemble molecules based on the molecular exciton theory
4. Relationship between CD and higher-ordered structure of DNA duplex
5. FRET theory and photoresponsive DNA
6. Fluorescent probe
7. Artificial nucleic acid
8. Antisense and RNAi
9. Self-assembly of DNA
10. New evolution of functional nucleic acids

●Textbook

●Additional Reading

Biomaterial Chemistry-Fundamentals and Applications-

●Grade Assessment

●Notes

●Contacting Faculty

Chemical Genetics (2.0credits) (化学遺伝学)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Biomolecular Engineering
Starts 1	Autumn Semester ,every other year
Lecturer	KIYONAKA Shigeki Professor

●Course Purpose
This course introduces current topics about new research fields such as animal cell technology, genetic engineering, chemical genetics and chemical biology. Participants are expected to make a presentation in these topics.

●Prerequisite Subjects
Biochemistry1-5

●Course Topics
1. Genetic engineering
2. Chemical genetics
3. Chemical Biology

●Textbook
Introduce in the class.

●Additional Reading
Biochemistry, D. Voet & J. G. Voet, 4th Edition.
Biochemsiry, J.M. Berg, L. Stryer, J.L. Tymoczko & G.L. Gatto, 8th Edition.

●Grade Assessment
This course is evaluated by presentation, debate and report.

●Notes
None

●Contacting Faculty
We always accept your questions.

Biochemical Engineeing (2.0credits) (生物化学工学)

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Lecture	
Course Name	Biomolecular Engineering	
Starts 1	Spring Semester ,every other year	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

Students learn the basic knowledge and engineering application in the biotechnological field, particularly the biochemistry engineering field and bring an element of the necessary originality and the engineering sense as an engineer and a researcher. Especially, they aim for coming to be able to do the following things by learning this lecture.1) to understand the enzyme utilizing production process and can explain them.2) to understand the microbial fermentation process and can explain them.3) to understand the mammalian cell process and can explain them.4) to understand the scale-up procedure and can explain them.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Molecular and Bio-environmental Process (2.0credits) (分子生命環境プロセス)

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Lecture		
Course Name	Biomolecular Engineering		
Starts 1	Autumn Semester ,every other year		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer

●Course Purpose

Students learn methodology for applying microbial functions to removal and degradation of contaminants from waste, bioremediation, production and recovery of resources and energies, and green chemical production. Through the class, students improve abilities for investigation, presentation and discussion.

●Prerequisite Subjects

Biochemistry, Microbiology, Bioprocess, Biotechnology

●Course Topics

1. What are environmental microbes (EM)? 2. Functions and characteristics of EM 3. Analyses of EM 4. Evolution of EM and ecosystem formation 5. Chemical transformation by EM 6. Extremophile 7. Drastic change of earth environment and its relation to EM 8. Microbial degradation of toxic chemicals 9. Bioremediation I10. Bioremediation II11. Environmental monitoring and microbes 12. Application of microbe to food production I 13. Application of microbe to food production II14. Biofuels I15. Biofuels IIStudents are expected to solve the questions in the end-of-chapter on their own. In addition, the reports about the contents of textbook should be solved and submitted.

●Textbook

●Additional Reading

As needed

●Grade Assessment

Submission of Report about environmental microbiology and applied microbiology.

●Notes

●Contacting Faculty

Advanced Biomolecular Engineering I (1.0credits) (生命分子工学特論Ⅰ)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Biomolecular Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Part-time Faculty

●Course Purpose

This course is intended to study the latest topics in various field of biomolecular engineering including molecular biochemistry and biosystems.
Top researchers are invited as lecturers to present their recent topics.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Biomolecular Engineering II (1.0credits) (生命分子工学特論 II)

Course Type	Specialized Courses
Division at course	Master's Course
Class Format	Lecture
Course Name	Biomolecular Engineering
Starts 1	Spring Semester ,every other year
Lecturer	Part-time Faculty

●Course Purpose

This course is intended to study the latest topics in various field of biomolecular engineering including molecular biochemistry and biosystems.
Top researchers are invited as lecturers to present their recent topics.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 1 (2.0credits) (分子生命化学特別実験及び演習 1

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will carefully read literature related to nanobio-instrumentation chemistry, bioanalytical chemistry, and analytical chemistry, practice handling analytical data and theoretical interpretation, and deepen their understanding of research trends in the relevant fields.

●Prerequisite Subjects

●Course Topics

Experiments will be conducted on medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, nanotechnology, and biomarker analysis.
As the experiments progress, relevant academic papers will be selected as appropriate, and the results of the experiments will be presented and discussed.
The results of the experiments to be presented should be discussed in advance and summarized in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of their oral presentation and participation in the discussion in the seminar. Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 1 (2.0credits) (分子生命化学特別実験及び演習 1

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor

●Course Purpose

The purpose of this class is to master various analytical and synthetic methods for biomolecules.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Physical Chemistry, Biochemistry,and Molecular Biology

●Course Topics

1. Analytical methods for nucleic acids and proteins (electrophoresis, MALDI-TOF MS, HPLC, etc.)2. Synthetic methods for nucleic acids and proteins (in vitro transcription, cell-free translation, E. coli overexpression, directed evolution, etc.)3. Peptide synthesis (MALDI-TOF MS, HPLC, etc.)

●Textbook

●Additional Reading

Molecular Biology of the Gene,James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard LosickISBN-10: 080539592XISBN-13: 978-0805395921

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You can come to our lab. Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Advanced Experiments and Exercises in Biomolecular Chemistry 1 (2.0credits) (分子生命化学特別実験及び演習 1

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

In this course, students will conduct experiments on their own research themes. Students will learn how to design, synthesize, and analyze biomolecules including nucleic acids and proteins and skills for making plan for research. The goal of this course are: 1) Collecting data according to their research project.2) Surveying literatures and collecting the information and knowledges of skills related their research. 3) Promoting their research through discussion about obtained research results and information.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 2 (2.0credits) (分子生命化学特別実験及び演習２

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will carefully read literature related to nanobio-instrumentation chemistry, bioanalytical chemistry, and analytical chemistry, practice handling analytical data and theoretical interpretation, and deepen their understanding of research trends in the relevant fields.

●Prerequisite Subjects

●Course Topics

Experiments will be conducted on medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, nanotechnology, and biomarker analysis.
As the experiments progress, relevant academic papers will be selected as appropriate, and the results of the experiments will be presented and discussed.
The results of the experiments to be presented should be discussed in advance and summarized in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of their oral presentation and participation in the discussion in the seminar. Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 2 (2.0credits) (分子生命化学特別実験及び演習２

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor

●Course Purpose
The purpose of this class is to master various analytical and synthetic methods for biomolecules.

●Prerequisite Subjects
Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics
1. Analytical methods for nucleic acids and proteins (electrophoresis, MALDI-TOF MS, HPLC, etc.)2. Synthetic methods for nucleic acids and proteins (in vitro transcription, cell-free translation, E. coli overexpression, directed evolution, etc.)3. Peptide synthesis (MALDI-TOF MS, HPLC, etc.)

●Textbook
N/A

●Additional Reading
Molecular Biology of the Gene,James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard LosickISBN-10: 080539592XISBN-13: 978-0805395921

●Grade Assessment
Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes
None

●Contacting Faculty
You can come to our lab. Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Advanced Experiments and Exercises in Biomolecular Chemistry 2 (2.0credits) (分子生命化学特別実験及び演習２

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

In this course, students will conduct experiments on their own research themes. Students will learn how to design, synthesize, and analyze biomolecules including nucleic acids and proteins and skills for making plan for research. The goal of this course are:

1) Collecting data according to their research project.

2) Surveying literatures and collecting the information and knowledges of skills related their research.

3) Promoting their research through discussion about obtained research results and information.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 3 (2.0credits) (分子生命化学特別実験及び演習３

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will carefully read literature related to nanobio-instrumentation chemistry, bioanalytical chemistry, and analytical chemistry, practice handling analytical data and theoretical interpretation, and deepen their understanding of research trends in the relevant fields.

●Prerequisite Subjects

●Course Topics

Experiments will be conducted on medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, nanotechnology, and biomarker analysis.
As the experiments progress, relevant academic papers will be selected as appropriate, and the results of the experiments will be presented and discussed.
The results of the experiments to be presented should be discussed in advance and summarized in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of their oral presentation and participation in the discussion in the seminar. Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 3 (2.0credits) (分子生命化学特別実験及び演習３

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor

●Course Purpose

The purpose of this class is to master various analytical and synthetic methods for biomolecules.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Analytical methods for nucleic acids and proteins (electrophoresis, MALDI-TOF MS, HPLC, etc.)2. Synthetic methods for nucleic acids and proteins (in vitro transcription, cell-free translation, E. coli overexpression, directed evolution, etc.)3. Peptide synthesis (MALDI-TOF MS, HPLC, etc.)

●Textbook

●Additional Reading

Molecular Biology of the Gene,James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard LosickISBN-10: 080539592XISBN-13: 978-0805395921

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You can come to our lab. Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Advanced Experiments and Exercises in Biomolecular Chemistry 3 (2.0credits) (分子生命化学特別実験及び演習３

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

In this course, students will conduct experiments on their own research themes. Students will learn how to design, synthesize, and analyze biomolecules including nucleic acids and proteins and skills for making plan for research. The goal of this course are:

1) Collecting data according to their research project.

2) Surveying literatures and collecting the information and knowledges of skills related their research.

3) Promoting their research through discussion about obtained research results and information.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 4 (2.0credits) (分子生命化学特別実験及び演習 4

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will carefully read literature related to nanobio-instrumentation chemistry, bioanalytical chemistry, and analytical chemistry, practice handling analytical data and theoretical interpretation, and deepen their understanding of research trends in the relevant fields.

●Prerequisite Subjects

●Course Topics

Experiments will be conducted on medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, nanotechnology, and biomarker analysis.
As the experiments progress, relevant academic papers will be selected as appropriate, and the results of the experiments will be presented and discussed.
The results of the experiments to be presented should be discussed in advance and summarized in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on the basis of their oral presentation and participation in the discussion in the seminar. Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biomolecular Chemistry 4 (2.0credits) (分子生命化学特別実験及び演習 4

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor

●Course Purpose

The purpose of this class is to master various analytical and synthetic methods for biomolecules.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Analytical methods for nucleic acids and proteins (electrophoresis, MALDI-TOF MS, HPLC, etc.)2. Synthetic methods for nucleic acids and proteins (in vitro transcription, cell-free translation, E. coli overexpression, directed evolution, etc.)3. Peptide synthesis (MALDI-TOF MS, HPLC, etc.)

●Textbook

N/A

●Additional Reading

Molecular Biology of the Gene,James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard LosickISBN-10: 080539592XISBN-13: 978-0805395921

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You can come to our lab. Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Advanced Experiments and Exercises in Biomolecular Chemistry 4 (2.0credits) (分子生命化学特別実験及び演習 4

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

In this course, students will conduct experiments on their own research themes. Students will learn how to design, synthesize, and analyze biomolecules including nucleic acids and proteins and skills for making plan for research. The goal of this course are:

1) Collecting data according to their research project.

2) Surveying literatures and collecting the information and knowledges of skills related their research.

3) Promoting their research through discussion about obtained research results and information.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

vanced Experiments and Exercises in Biosystem Engineering 1 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this class is to acquire the skill for making a plan for research project in the important issue in chemical genetics field and to obtain the basic skills in chemical genetics experiments.

The goal by learning this class is to botain the following ability.

1. To obtain experimental skill required for chemical genetics field.
2. To survey related papers, and plan the research project.
3. To promote research and report and discuss the results.

Review literature and collect data according to weekly research plan.

●Prerequisite Subjects

Chemistry and Biotechnology Laboratory 1-4, Graduation Thesis A, B.

●Course Topics

1.Survey of related papers, and planning the research project. 2. Data collection using experimental skill obtained. 3. Report of the results and discussion.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation, oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

vanced Experiments and Exercises in Biosystem Engineering 1 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to understand technical basics in biotechnology fields and to learn engineering sense from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand recent research methods.3. Understand and analyze recent topics on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

vanced Experiments and Exercises in Biosystem Engineering 1 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

The purpose of this course is to acquire experimental skills for engineering bacteria and proteins through various experiments and exercises. Achievement objective 1. Students can conduct various experiments for functional analysis of bacteria and proteins, and can evaluate the resulting data. 2. Students can insert or delete target gene to or from genome or plasmid, and evaluate resulting change in phenotypes.3. Students can design, express, and purify recombinant proteins.

●Prerequisite Subjects

Biochemistry (1, 2, 3, 4, 5) with Exercises

●Course Topics

1. Genetic recombination 2. Recombinant protein expression 3. Protein purification and purity evaluation, 4. Western Blotting, 5.Confocal laser scanning microscopy, 6. Flow cytometry, 7. Immunoprecipitation and pull-down assay, 8. Circular dichroism spectroscopy, 9. Protein crystallographyPre-learning about the experiment methods before each class. After a series of experiments, give an oral presentation about the experiment and submit a report.

●Textbook

None of textbook. Distribute recent papers as needed.

●Additional Reading

We introduce articles or textbooks as appropriate as the practice progresses.

●Grade Assessment

Achievement score is evaluated by reports(40%), presentations(40%) and oral examinations(20%). Passing score is over 60 out of 100 points.

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

vanced Experiments and Exercises in Biosystem Engineering 2 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this class is to acquire the skill for making a plan for research project in the important issue in chemical genetics field and to obtain the basic skills in chemical genetics experiments.

The goal by learning this class is to botain the following ability.

1. To obtain experimental skill required for chemical genetics field.
2. To survey related papers, and plan the research project.
3. To promote research and report and discuss the results.

●Prerequisite Subjects

Chemistry and Biotechnology Laboratory 1-4, Graduation Thesis A, B.

●Course Topics

1.Survey of related papers, and planning the research project.
2. Data collection using experimental skill obtained.
3. Report of the results and discussion.

Review literature and collect data according to weekly research plan.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the following: presentation, oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

vanced Experiments and Exercises in Biosystem Engineering 2 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to understand technical basics in biotechnology fields and to learn engineering sense from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand recent research methods.3. Understand and analyze recent topics on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

vanced Experiments and Exercises in Biosystem Engineering 2 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

The purpose of this course is to acquire experimental skills for engineering bacteria and proteins through various experiments and exercises. Achievement objective 1. Students can conduct various experiments for functional analysis of bacteria and proteins, and can evaluate the resulting data. 2. Students can insert or delete target gene to or from genome or plasmid, and evaluate resulting change in phenotypes.3. Students can design, express, and purify recombinant proteins.

●Prerequisite Subjects

Biochemistry (1, 2, 3, 4, 5) with Exercises

●Course Topics

1. Genetic recombination 2. Recombinant protein expression 3. Protein purification and purity evaluation, 4. Western Blotting, 5.Confocal laser scanning microscopy, 6. Flow cytometry, 7. Immunoprecipitation and pull-down assay, 8. Circular dichroism spectroscopy, 9. Protein crystallographyPre-learning about the experiment methods before each class. After a series of experiments, give an oral presentation about the experiment and submit a report.

●Textbook

None of textbook. Distribute recent papers as needed.

●Additional Reading

We introduce articles or textbooks as appropriate as the practice progresses.

●Grade Assessment

Achievement score is evaluated by reports(40%), presentations(40%) and oral examinations(20%). Passing score is over 60 out of 100 points.

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

vanced Experiments and Exercises in Biosystem Engineering 3 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this class is to acquire the skill for making a plan for research project in the important issue in chemical genetics field and to obtain the basic skills in chemical genetics experiments.

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1. To obtain experimental skill required for chemical genetics field.
2. To survey related papers, and plan the research project.
3. To promote research and report and discuss the results.

●Prerequisite Subjects

Chemistry and Biotechnology Laboratory 1-4, Graduation Thesis A, B.

●Course Topics

1. Survey of related papers, and planning the research project.
2. Data collection using experimental skill obtained.
3. Report of the results and discussion.

Review literature and collect data according to weekly research plan.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

vanced Experiments and Exercises in Biosystem Engineering 3 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to understand technical basics in biotechnology fields and to learn engineering sense from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand recent research methods.3. Understand and analyze recent topics on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biosystem Engineering 3 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

The purpose of this course is to acquire experimental skills for engineering bacteria and proteins through various experiments and exercises. Achievement objective 1. Students can conduct various experiments for functional analysis of bacteria and proteins, and can evaluate the resulting data. 2. Students can insert or delete target gene to or from genome or plasmid, and evaluate resulting change in phenotypes.3. Students can design, express, and purify recombinant proteins.

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●Textbook

None of textbook. Distribute recent papers as needed.

●Additional Reading

We introduce articles or textbooks as appropriate as the practice progresses.

●Grade Assessment

Achievement score is evaluated by reports(40%), presentations(40%) and oral examinations(20%). Passing score is over 60 out of 100 points.

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

vanced Experiments and Exercises in Biosystem Engineering 4 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this class is to acquire the skill for making a plan for research project in the important issue in chemical genetics field and to obtain the basic skills in chemical genetics experiments.

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1. To obtain experimental skill required for chemical genetics field.
2. To survey related papers, and plan the research project.
3. To promote research and report and discuss the results.

●Prerequisite Subjects

Chemistry and Biotechnology Laboratory 1-4, Graduation Thesis A, B.

●Course Topics

1. Survey of related papers, and planning the research project.
2. Data collection using experimental skill obtained.
3. Report of the results and discussion.

Review literature and collect data according to weekly research plan.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

vanced Experiments and Exercises in Biosystem Engineering 4 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses	
Division at course	Master's Course	
Class Format	Experiment and Exercise	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to understand technical basics in biotechnology fields and to learn engineering sense from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand recent research methods.3. Understand and analyze recent topics on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Advanced Experiments and Exercises in Biosystem Engineering 4 (2.0credits) (生命システム工学特別実験及び演習

Course Type	Specialized Courses		
Division at course	Master's Course		
Class Format	Experiment and Exercise		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

The purpose of this course is to acquire experimental skills for engineering bacteria and proteins through various experiments and exercises. Achievement objective 1. Students can conduct various experiments for functional analysis of bacteria and proteins, and can evaluate the resulting data. 2. Students can insert or delete target gene to or from genome or plasmid, and evaluate resulting change in phenotypes.3. Students can design, express, and purify recombinant proteins.

●Prerequisite Subjects

Biochemistry (1, 2, 3, 4, 5) with Exercises

●Course Topics

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●Textbook

None of textbook. Distribute recent papers as needed.

●Additional Reading

We introduce articles or textbooks as appropriate as the practice progresses.

●Grade Assessment

Achievement score is evaluated by reports(40%), presentations(40%) and oral examinations(20%). Passing score is over 60 out of 100 points.

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

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	Shinji DOKI 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

Papers, books and/or documents that the lecturer (DP) will introduce.

●Additional Reading

Papers, books and/or documents that the lecturer (DP) will introduce.

●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

No specific requirements.

●Contacting Faculty

The lecturer (DP) and the 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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●Contacting Faculty

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

Laboratory Visit 1 U2 (2.0credits) (研究室ローテーション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
	Chemical Systems 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
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
	Chemical Systems 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
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
	Chemical Systems 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
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
	Chemical Systems 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
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
	Chemical Systems 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
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.

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	Hideo KISHIDA 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 researchers
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.

This lecture will be given in an on-demand format using NUCT. In each lecture (1st lecture: Apr. 11), the course materials should be downloaded from the NUCT. If you cannot access the NUCT site of this lecture, please contact the instructor (Kishida, kishida@nagoya-u.jp) by e-mail with your name and student number. Even in this case, the registration is required.

●Contacting Faculty

After each class student can ask questions through the message function of NUCT.
Otherwise, contact to:
Prof. Kishida kishida@nagoya-u.jp

The exchange of opinions among the students can be made through the message function of NUCT.

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

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	Manato DEKI 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

Participate in the VBL Symposium held around November, attend supplementary lectures, and submit a report.

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.

Important Notes
Students who wish to take the course will be able to register for the "Advanced Lectures on Frontier Technologies and Sciences" at NUCT after they have registered for the course.
Note that all contacts from NUCT are available for the lectures.
Students who missed the registration period should register the page of "Advanced Lectures on Frontier Technologies and Sciences" on the NUCT website.

●Contacting Faculty

Arranging the schedules by e-mail and etc.

Advanced Experiments for Frontier Technologies and Sciences (1.0credits) (最先端理工学実験)

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	Manato DEKI Associate Professor		

●Course Purpose

In order to advance research in engineering, it is necessary to learn about the latest research trends through practice. The purpose of this experiment is to conduct research experiments using the most advanced experimental equipment and simulators. Through this experiment, students will be able to understand the principles and learn how to use the equipment owned by VBL (maskless exposure system, dry etching system, atomic layer deposition system, metal deposition system) and device simulators. In addition, the goal is to comprehensively acquire knowledge and skills related to advanced experiments and presentation techniques for the assigned research by reporting the results.

●Prerequisite Subjects

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

●Course Topics

The experiment will be conducted at the Venture Business Laboratory building.
The report meeting will be held online or at the above building.
If you choose an assigned experiment with a predetermined task, the required curriculum includes the use of either a maskless exposure system, ICP etching system, or atomic layer deposition system. Students will use these devices to perform their assignments and learn the principles and practical use of these devices. In the case of experiments proposed by the students (original experiments), the students will propose their own device simulation experiments and research using the above equipment, and work with the instructor to produce experimental results. In the end, students will organize and discuss the results, present their findings, and learn how to practically use state-of-the-art equipment and simulation skills.

Students should learn the basic knowledge of the research they are assigned.

●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
Course Registration
No course requirements.
The number of registered students should be about 10.

Important Notes
Students who wish to take the course will be able to register for the "Advanced Experiments for Frontier Technologies and Sciences" at NUCT after they have registered for the course.
Note that all contacts from NUCT are available for the lectures.
Students who missed the registration period should register the page of "Advanced Experiments for Frontier Technologies and Sciences" on the NUCT website.

●Contacting Faculty
We will respond via NUCT's message system and e-mail.

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
	Automotive Engineering	Automotive Engineering	Civil and Environmental Engineering Graduate
	Physical 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

Textbooks and references are not assigned for this class. However, depending on the student and class progress, necessary materials 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.
This class will be held face to face unless there are international students who cannot come to Japan.

●Contacting Faculty

Questions will be answered before class, in class, after class or by e-mail.
E-mail address　o47251a@cc.nagoya-u.ac.jp

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	Yasuhiko SAKAI 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
The lecturer will answer questions about the content of the lesson, and the instructor in charge will answer other questions.

ysakai@mech.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	Physical 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
Lecturer	Part-time Faculty		

●Course Purpose

This course aims to help students write a well-structured research paper in English and expand their vocabulary and expression list relating to academic writing.
By the end of the course, students will be able to:
- explain the basic structure of a research paper
- explain the characteristics of each component
- use vocabulary adequately
- use expressions adequately
- choose the most relevant citation style
- write a mini research paper

●Prerequisite Subjects

"English (basic)" and "English (intermediate)" (or equivalent)

●Course Topics

English is the language of instruction in this course.
After reviewing the basics of academic writing, students will understand the fundamental structure of the research paper. Students will improve their vocabulary and expressions to write a well-structured paper as they analyze sample research papers. Additionally, students will understand the citation styles by exploring the descriptions in the instructions for authors in the academic journals of their choice. In the classroom activities, students will exchange ideas, give an oral presentation, practice their writing skills, and give feedback to each other.
1. Basics of academic writing in English 1: Paragraph writing
2. Basics of academic writing in English 2: Making an outline
3. Fundamental structure of research paper: Structural analysis

4. Oral presentation: Journals, instructions for authors, and citation styles
5. Writing 1: Title and abstract
6. Writing 2: Research method
7. Writing 3: Results and discussions
8. Writing 4: Introduction and conclusion

●Textbook

No textbook for this class. Handouts will be distributed in class.

●Additional Reading

Glasman-Deal, H. (2021). Science Research Writing: For Non-Native Speakers of English. Imperial College Press.
Paltridge, B. (2019). Thesis and Dissertation Writing in a Second Language. Routledge.
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

The following evaluation items constitute the maximum score of 100:
Class Participation (25%)
Homework Assignments (35%)
Oral Presentation (10%)
Mini-Research Paper (30%)
A student must evidence a total score of 60 or higher on the final grading scale to pass this course.

●Notes

-No prerequisite.
-There is a chance to redesign the class format, schedule, and grading system depending on the COVID-19 situation.
-There will be approximately six face-to-face classes and two online (synchronous or on-demand) classes.
-Online, synchronous classes will be given on Zoom, whereas the on-demand classes will be given on NUCT.
-The first class will be met face-to-face in the regular classroom on campus, and the class format in the remaining semester will be announced via "Messages" on NUCT.
-Students are expected to express/exchange their ideas and opinions on NUCT and/or on another interactive presentation system to be announced in class.
-An active dialog is highly valued in this class, so your enthusiastic participation is vital to the success of your learning.
-Basically, homework is assigned on a weekly basis.

●Contacting Faculty

Use the "Messages" tool on NUCT to contact the instructor. Only for a limited period of time (until the secondary course registration period ends), you can reach the instructor by email.
smrym(at)lets.chukyo-u.ac.jp
Please replace (at) with @, the at symbol.

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	Part-time Faculty	Manato DEKI Assistant 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

Through the trend and environment of venture business in our country, we will consider what is necessary to actually and personally launch a venture business.

1. commercialization and entrepreneurship Why venture business ---Risks and advantages
2. knowledge and preparation for commercialization and entrepreneurship ---points to keep in mind as an engineer/researcher
3. from university research to commercialization/start-up --- how to proceed with R&D in a company
4. promotion of commercialization ---negotiations and market research for commercialization ----.
5. innovation theory
6. case studies in the mobility field
7. biotechnology and medical fields
8. case studies in the field of electronic devices
9. technology management (patents, etc.)
10. summary

A report will be assigned, so students should identify and discuss their own interests and issues while attending the lecture.

●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.

Important Notes
Students who wish to take the course will be able to register for the "Focus on Venture Business I" at NUCT after they have registered for the course.
Note that all contacts from NUCT are available for the lectures.
Students who missed the registration period should register the page of "Focus on Venture Business I" on the NUCT website.
In addition, all lectures will be conducted remotely using online conferencing tools.

●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	Manato DEKI Assistant 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.

Lectures will be held in a discussion style.
As a part of this, the maximum number of registered students will be set at 60.
If the number of registered students exceeds 60, students will be selected by lottery. The number of students will be determined by lottery.
Students who wish to take this course should first register at NUCT.
Information on the lottery will be sent to applicants via the NUCT lecture website.

However, students enrolled in the "DII Collaborative Graduate Program for Accelerating Innovation in Future Electronics " may take the course without a lottery.

●Prerequisite Subjects

●Course Topics

1. the japanese economy and venture business
2. current status of venture business
Venture and management strategy
Venture and marketing strategy
Venture Business and Corporate Accounting
Venture and financial strategy
7. case studies (emphasis on management strategy)

8. case study (focus on marketing strategy)
9. case study (focus on financial strategy)
10. case study (focus on capital policy: IPO company)
11. business plan business idea and competitive advantage
Business Plan Profitability Plan
13. business plan financial plan
Business Plan Business Plan Operation and Summary
15. summary

It is necessary for future businesses to research and understand various literature and online information regarding the lecture content.

●Textbook

●Additional Reading

●Grade Assessment

●Notes

Lectures will be held in a discussion style.
As a part of this, the maximum number of registered students will be set at 60.
If the number of registered students exceeds 60, students will be selected by lottery. The number of students will be determined by lottery.
Students who wish to take this course should first register at NUCT.
Information on the lottery will be sent to applicants via the NUCT lecture website.

However, students enrolled in the "DII Collaborative Graduate Program for Accelerating Innovation in Future Electronics " may take the course without a lottery.

●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	Biomolecular Engineering
Starts 1	1 Spring and Autumn Semester
Lecturer	Associated Faculty

●Course Purpose
In the course of the internship program, students make research works concerningpredetermined themes in research and developing sections of university-outsideresearch organization such as cooperating companies etc. Through the program, the students are expected to learn the practical ways of problem-setting and solving at the front of research and developing in the research organization activities, and to have the wide knowledge of the practical aspects of the scientific and engineering fields they are studying in the university.

●Prerequisite Subjects
Each subject studied in Department of Chemistry and Biotechnology and also in Department of Biomolecular Engineering

●Course Topics
Students' research contents are negotiated by agreement with the companies etc.

●Textbook
Nothing in particular

●Additional Reading
Nothing in particular

●Grade Assessment
The achievement is evaluation by corporate leaders, oral presentations of researchresults, and reports

●Notes
Contact with your supervisor and persons in charge of hosting companies etc.

●Contacting Faculty
Academic advisors and persons in charge of hosting companies etc.

International Cooperative Research Project U2 (2.0credits) (国際共同研究 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
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose of this international project is to develop young researchers who have comprehensive and international abilities and can play an active role internationally.

Through this project, students will be able to
1) make an original research plan and perform it.
2) communicate and discuss with other foreign researchers in English fluently.
3) enhance their research and presentation skills.

●Prerequisite Subjects

Basic engineering classes, English, Technical English

●Course Topics

Experience R & D at overseas research institutes as follows.
1) Set a research theme and make a research plan based on discussions with overseas supervisors and conduct research.
2) Present your research results in English at your place of stay and discuss.
3) After returning to Japan, report the contents of research activities to the supervisor and receive comprehensive evaluation.

●Textbook

Will be designated by the supervisor in the visiting university (or research group).

●Additional Reading

Will be designated by the supervisor in the visiting university (or research group).

●Grade Assessment

Receive the evaluation of the instructor in your stay regarding the theme setting, research ability, and discussion method at the joint research destination. After returning to Japan, submit and present a report to the supervisor of the University. If the above results are comprehensively evaluated and it is deemed that sufficient research achievement ability has been acquired, the credits will be awarded.

●Notes

TBA; Contact with your supervisor and mentor.

●Contacting Faculty

Ask to the supervisors in Nagoya university and visiting research group.

Course Type	Comprehensive engineering courses		
Division at course	Master's Course		
Class Format	Practice		
Course Name	Molecular and Macromolecular Chemistry	Materials Chemistry	Biomolecular Engineering
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose of this international project is to develop young researchers who have comprehensive and international abilities and can play an active role internationally.Through this project, students will be able to1) make an original research plan and perform it.2) communicate and discuss with other foreign researchers in English fluently.3) enhance their research and presentation skills.

●Prerequisite Subjects

Basic engineering classes, English, Technical English

●Course Topics

Experience R & D at overseas research institutes as follows.1) Set a research theme and make a research plan based on discussions with overseas supervisors and conduct research.2) Present your research results in English at your place of stay and discuss.3) After returning to Japan, report the contents of research activities to the supervisor and receive comprehensive evaluation.

●Textbook

Will be designated by the supervisor in the visiting university (or research group).

●Additional Reading

Will be designated by the supervisor in the visiting university (or research group).

●Grade Assessment

Receive the evaluation of the instructor in your stay regarding the theme setting, research ability, and discussion method at the joint research destination. After returning to Japan, submit and present a report to the supervisor of the University. If the above results are comprehensively evaluated and it is deemed that sufficient research achievement ability has been acquired, the credits will be awarded.

●Notes

TBA; Contact with your supervisor and mentor.

●Contacting Faculty

Ask to the supervisors in Nagoya university and visiting research group.

International Cooperative Research Project U4 (4.0credits) (国際共同研究 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
Starts 1	1 Spring and Autumn Semester	1 Spring and Autumn Semester	1 Spring and Autumn Semester
Lecturer	Associated Faculty	Associated Faculty	Associated Faculty

●Course Purpose

The purpose of this international project is to develop young researchers who have comprehensive and international abilities and can play an active role internationally.

Through this project, students will be able to
1) make an original research plan and perform it.
2) communicate and discuss with other foreign researchers in English fluently.
3) enhance their research and presentation skills.

●Prerequisite Subjects

Basic engineering classes, English, Technical English

●Course Topics

Experience R & D at overseas research institutes as follows.
1) Set a research theme and make a research plan based on discussions with overseas supervisors and conduct research.
2) Present your research results in English at your place of stay and discuss.
3) After returning to Japan, report the contents of research activities to the supervisor and receive comprehensive evaluation.

●Textbook

Will be designated by the supervisor in the visiting university (or research group).

●Additional Reading

Will be designated by the supervisor in the visiting university (or research group).

●Grade Assessment

Receive the evaluation of the instructor in your stay regarding the theme setting, research ability, and discussion method at the joint research destination. After returning to Japan, submit and present a report to the supervisor of the University. If the above results are comprehensively evaluated and it is deemed that sufficient research achievement ability has been acquired, the credits will be awarded.

●Notes

TBA; Contact with your supervisor and mentor.

●Contacting Faculty

Ask to the supervisors in Nagoya university and visiting research group.

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	Tatsuya SUZUKI Professor	Takeshi KATAKAI Designated Associate Professor	JIANG Meilan Designated Lecturer
	Eiji ABE Assistant Professor	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

Mail to:katakai@coi.nagoya-u.ac.jp

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

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 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	Tatsuya SUZUKI Professor	Takeshi KATAKAI Designated Associate Professor	JIANG Meilan Designated Lecturer
	Eiji ABE Assistant Professor	Faculty of Advanced Mobility Program	

●Course Purpose

To train the students who can play an active role in the mobility industry or research institute. To provide break down study on the EV using commercial electric vehicles and a university formula car. After understanding the mechanism of the EV structure, to produce a mini car for automatic driving. Students themselves will build a software system that realizes a basic automatic driving such as lane tracking. This course is organized as follows:1. Learn the basics of technological development in the mobility industry2. Understand the structure and driving mechanism of electric vehicles3. Understanding autonomous driving technology through the production of a mini cars for autonomous driving4. Understand the software architecture for autonomous driving5. Understand cognition technology for lane detection / follow-up control and on-board installation6. Understand control technology for obstacle detection / avoidance and on-board installation

●Prerequisite Subjects

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

●Course Topics

After experiencing the break down study using commercial EV and an electric formula car, produce a mini car for autonomous driving and develop autonomous driving algorithm. After learning the basic movements of running, turning, and stopping, develop lane tracing algorithm to follow the white line by image recognition. A contest will be held at the end of the training. A special certificate will be issued to students who have completed the prescribed grades in this course. The content of the class is as follows.1. Electric vehicle structure and running mechanism2. Vehicle characteristic analysis and improvement methods3. Examination of software architecture for autonomous driving4. Understand and implement cognition technology for lane detection5. Understand and implement control technology for follow-up control6. Understand control technology for obstacle detection / avoidance

●Textbook

Original lecture note will be provided.

●Additional Reading

It will be announced in the class if necessary.

●Grade Assessment

Evaluation is based on the student's effort for solving the tasks, total score of reports, 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

Mail to:katakai@coi.nagoya-u.ac.jp

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

●Course Purpose

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

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

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

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

●Textbook
Will be designated by each supervisor.

●Additional Reading
Will be designated by each supervisor.

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

●Notes
No conditions for taking the course.

●Contacting Faculty
Supervisor of visiting university basically takes care.

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

●Course Purpose

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

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

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

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

●Textbook

Will be designated by each supervisor.

●Additional Reading

Will be designated by each supervisor.

●Grade Assessment

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

●Notes

No conditions for taking the course.

●Contacting Faculty

Supervisor of visiting university basically takes care.

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

●Course Purpose

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

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

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

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

●Textbook

Will be designated by each supervisor.

●Additional Reading

Will be designated by each supervisor.

●Grade Assessment

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

●Notes

No conditions for taking the course.

●Contacting Faculty

Supervisor of visiting university basically takes care.

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

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

●Course Purpose

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

●Prerequisite Subjects

Basic engineering subjects, English, Technical English

●Course Topics

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

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

Written report and evaluation by the professors.

●Notes

No conditions for taking the course.

●Contacting Faculty

In the class and E-mail.

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

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

●Course Purpose

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

●Prerequisite Subjects

English, Technical English, Japanese

●Course Topics

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

●Textbook

Will be designated by the lecturer.

●Additional Reading

Will be designated by the lecturer.

●Grade Assessment

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

●Notes

No conditions for taking the course.

●Contacting Faculty

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

Seminar on Biomolecular Chemistry 2A (2.0credits) (分子生命化学セミナー 2A)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2A (2.0credits) (分子生命化学セミナー 2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

N/A

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 2A (2.0credits) (分子生命化学セミナー 2A)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2B (2.0credits) (分子生命化学セミナー 2B)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2B (2.0credits) (分子生命化学セミナー 2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 2B (2.0credits) (分子生命化学セミナー 2B)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2C (2.0credits) (分子生命化学セミナー2C)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2C (2.0credits) (分子生命化学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

N/A

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 2C (2.0credits) (分子生命化学セミナー2C)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2D (2.0credits) (分子生命化学セミナー 2D)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2D (2.0credits) (分子生命化学セミナー 2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

N/A

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 2D (2.0credits) (分子生命化学セミナー 2D)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2E (2.0credits) (分子生命化学セミナー 2E)

Course Type	Specialized Courses	
Division at course	Doctor's Course	
Class Format	Seminar	
Course Name	Biomolecular Engineering	
Starts 1	3 Spring Semester	
Lecturer	Yoshinobu BABA Professor	Takao YASUI Associate Professor

●Course Purpose

Students will read literature related to nanobioinstrumentation chemistry, bioanalytical chemistry, and analytical chemistry, learn how to plan research, prepare for experiments, and summarize research methods, and deepen their understanding of research trends in related fields.

●Prerequisite Subjects

●Course Topics

Students will learn about medical diagnostic technologies with keywords such as nano-biodevices, micro-chemical systems, genomic drug discovery/genomic medicine, single molecule analysis, single cell analysis, and biomarker analysis.
As the seminar progresses, relevant academic papers will be selected for presentation and discussion.
Students are required to read the relevant academic papers to be presented carefully in advance and summarize the contents in a PowerPoint presentation.

●Textbook

●Additional Reading

●Grade Assessment

Students will be evaluated on their achievement of the objectives based on their oral presentations in the seminar and their participation in the discussions.
A grade of "C" or higher is required for each of these, and a score of 60 or higher on a 100-point scale is considered passing.
Oral presentation (50%), participation in the discussion (50%)

●Notes

●Contacting Faculty

Seminar on Biomolecular Chemistry 2E (2.0credits) (分子生命化学セミナー 2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	3 Spring Semester		
Lecturer	Hiroshi MURAKAMI Professor	HAYASHI Gosuke Associate Professor	FUJINO Tomoshige Assistant Professor

●Course Purpose

The purpose of this class is to gain an understanding of analytical and synthetic methods for biomolecules by reading advanced textbooks and research reports published in scientific journals.

●Prerequisite Subjects

Analytical Chemistry, Organic Chemistry, Biochemistry, and Molecular Biology

●Course Topics

1. Reading and explaining advanced textbooks2. Reviewing research articles3. Research proposals

●Textbook

N/A

●Additional Reading

Text books will be announced in the beginning of the course.

●Grade Assessment

Your overall grade in the class will be decided based on the following:- Oral presentation: 60%- Q&A session: 40%

●Notes

None

●Contacting Faculty

You may contact me after a lecture.Otherwise you may contact us by phone or email.Prof. Murakami (Phone: 052-789-3327; Email: murah@chembio.nagoya-u.ac.jp)Prof. Hayashi (Phone: 052-789-3302; Email: hayashi@chembio.nagoya-u.ac.jp)

Seminar on Biomolecular Chemistry 2E (2.0credits) (分子生命化学セミナー 2E)

Course Type	Specialized Courses		
Division at course	Doctor's Course		
Class Format	Seminar		
Course Name	Biomolecular Engineering		
Starts 1	3 Spring Semester		
Lecturer	Hiroyuki ASANUMA Professor	Hiromu KASHIDA Associate Professor	Yukiko KAMIYA Associate Professor
	Keiji MURAYAMA Assistant Professor		

●Course Purpose

This course is intend to gain understanding of basic concepts and recent topics of biopolymers and biomaterials including, synthetic method, structure, properties, and functions through presentation and discussion in seminar. Students will be given opportunities to prepare presentations, introduce research papers in journal club, and present research progress.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2A (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire advanced knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
5. Lead the free discussion.

●Prerequisite Subjects

Biochemistry 1-5, Seminar on Biosystem Engineering 1A-1D, Advanced Experiments and Exercises in Biosystem Engineering 1-4

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.
Review literature and collect data according to weekly guidance.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 2A (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2A (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	1 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students brush up the skill for obtaining new references timely and for feedback to own research. Students brush up the skill for debating about the recent papers on various view points and evaluating the direction of the research.

●Prerequisite Subjects

Fundamentals of Biosystem Engineering, Seminar on Biosystem Engineering (1A, 1B, 1C, 1D

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

We introduce articles or textbooks as appropriate as the seminar progresses.

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 2B (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire advanced knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
5. Lead the free discussion.

●Prerequisite Subjects

Biochemistry 1-5, Seminar on Biosystem Engineering 1A-1D, Advanced Experiments and Exercises in Biosystem Engineering 1-4

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.
Review literature and collect data according to weekly guidance.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 2B (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	1 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2B (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	1 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students brush up the skill for obtaining new references timely and for feedback to own research. Students brush up the skill for debating about the recent papers on various view points and evaluating the direction of the research.

●Prerequisite Subjects

Fundamentals of Biosystem Engineering, Seminar on Biosystem Engineering (1A, 1B, 1C, 1D, 2A

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

We introduce articles or textbooks as appropriate as the seminar progresses.

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 2C (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire advanced knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
5. Lead the free discussion.

●Prerequisite Subjects

Biochemistry 1-5, Seminar on Biosystem Engineering 1A-1D, Advanced Experiments and Exercises in Biosystem Engineering 1-4

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.
Review literature and collect data according to weekly guidance.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 2C (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2C (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	2 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students brush up the skill for obtaining new references timely and for feedback to own research. Students brush up the skill for debating about the recent papers on various view points and evaluating the direction of the research.

●Prerequisite Subjects

Fundamentals of Biosystem Engineering, Seminar on Biosystem Engineering (1A, 1B, 1C, 1D, 2A, 2B

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

We introduce articles or textbooks as appropriate as the seminar progresses.

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 2D (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire advanced knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
5. Lead the free discussion.

●Prerequisite Subjects

Biochemistry 1-5, Seminar on Biosystem Engineering 1A-1D, Advanced Experiments and Exercises in Biosystem Engineering 1-4

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.
Review literature and collect data according to weekly guidance.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 2D (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	2 Autumn Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2D (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	2 Autumn Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose

Students brush up the skill for obtaining new references timely and for feedback to own research. Students brush up the skill for debating about the recent papers on various view points and evaluating the direction of the research.

●Prerequisite Subjects

Fundamentals of Biosystem Engineering, Seminar on Biosystem Engineering (1A, 1B, 1C, 1D, 2A, 2B, 2C

●Course Topics

1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook

We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading

We introduce articles or textbooks as appropriate as the seminar progresses.

●Grade Assessment

Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes

No course requirements.

●Contacting Faculty

Ask anything at any working time.

Seminar on Biosystem Engineering 2E (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	3 Spring Semester	
Lecturer	KIYONAKA Shigeki Professor	Hidenori KANEOKA Assistant Professor

●Course Purpose

The purpose of this seminar is to acquire advanced knowledge in the field of chemical genetics.
The goal by learning this class is to botain the following ability.
1. To survey and select superior paper that leads to new concept or technology.
2. To summarize and present recent trends of the research.
3. To propose the direction of the research project.
4. To present and discuss research progress of own project.
5. Lead the free discussion.

●Prerequisite Subjects

Biochemistry 1-5, Seminar on Biosystem Engineering 1A-1D, Advanced Experiments and Exercises in Biosystem Engineering 1-4

●Course Topics

1. Journal club. 2. Research progress report. The course is proceeded with free discussion in the form of seminar.
Review literature and collect data according to weekly guidance.

●Textbook

Introduce in the class.

●Additional Reading

Introduce in the class.

●Grade Assessment

Grade will be decided based on the presentation and oral examination.

●Notes

●Contacting Faculty

contact: kiyonaka@chembio.nagoya-u.ac.jp Phone 052-789-4275

Seminar on Biosystem Engineering 2E (2.0credits) (生命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	Biomolecular Engineering	
Starts 1	3 Spring Semester	
Lecturer	Hiroyuki HONDA Professor	Kazunori SHIMIZU Associate Professor

●Course Purpose

The purpose of this course is to introduce and analyze recent academic papers in biotechnology fields from the basic and applied aspects and to discuss future developments from a biotechnological standpoint.By learning this lecture, the goal is to be able to:1. Select recent academic papers in basics and applications in the field of biotechnology.2. Understand and explain the contents of them.3. Propose future works relating to the papers introduced.4. Explain the individual progress report and give an opinion on the future development.

●Prerequisite Subjects

●Course Topics

●Textbook

●Additional Reading

●Grade Assessment

●Notes

●Contacting Faculty

Seminar on Biosystem Engineering 2E (2.0credits) (生命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	Biomolecular Engineering		
Starts 1	3 Spring Semester		
Lecturer	Katsutoshi HORI Professor	Atuo SUZUKI Associate Professor	HajimeNAKATANI Lecturer
	Masahito ISHIKAWA Assistant Professor		

●Course Purpose
Students brush up the skill for obtaining new references timely and for feedback to own research. Students brush up the skill for debating about the recent papers on various view points and evaluating the direction of the research.

●Prerequisite Subjects
Fundamentals of Biosystem Engineering, Seminar on Biosystem Engineering (1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D

●Course Topics
1. Artilcle introduction 2. Presetation about progress in researchYou will introduce recent academic papers and report on your research progress in order, so be sure to prepare for your presentation before your turn.

●Textbook
We introduce articles or textbooks as appropriate as the seminar progresses.

●Additional Reading
We introduce articles or textbooks as appropriate as the seminar progresses.

●Grade Assessment
Achievement score is evaluated by effort for preparation (20%), presentation (30%), response to questions (30%), and results of homework (20%).

●Notes
No course requirements.

●Contacting Faculty
Ask anything at any working time.

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

●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

●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

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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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	Shinji DOKI 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

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●Additional Reading

Papers, books and/or documents that the staff instructing the training in the company will introduce.

●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

No specific requirements.

●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.

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	Shinji DOKI 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

Papers, books and/or documents that the lecturer (DP) will introduce.

●Additional Reading

Papers, books and/or documents that the lecturer (DP) will introduce.

●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

No specific requirements.

●Contacting Faculty

The lecturer (DP) and the 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	Manato DEKI 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 device process system and device 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 electronic device process system and device 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 electronic device process system and device 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 understandinginonefieldfromelectronic device process and device simulation.

●Contacting Faculty

Arranging the schedules by e-mail and etc.