Academic Year 2018

Special Integrated Science Course

Syllabus (Seminars)

April 1st, 2018

Osaka University, Graduate School of Science

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1 Master Course

(SISC)Interactive Seminar(For Students Enrolled Fall)

Course Code	24S024
Course Number	24CHEM6G014
Credits	1
Instructor	FUNAHASHI Yasuhiro Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Doctor Course(Special Integrated Science Course) each academic year Chemistry: optional required / Bioscience, Macromolecular Science : optional
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	This course provides an opportunity to arise an interest in various field of science and to broaden your horizons through the discussion about your research with professors in the field different from yours.
Learning Goals	Students can get the wide-spread interests in science, and general understanding of their research achievements.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Discussion about your research with professors in the field different from your main laboratory. For the discussion, laboratories should be chosen from among the laboratories in department of chemistry, bioscience, and macromolecular Science.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Grading based on the results of the presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S400
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	NAKAGAWA Takuro Office: C512, A414 Phone: 5432 Email : takuro4@bio.sci.osaka-u.ac.jp
Office Hours	
Eligibility	Department of Biological Sciences, Special Integrated Science Course (SISC), Graduate School of Science Required
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	The main objective of this course is to learn the molecular mechanisms behind DNA replication, recombination, and DNA damage repair as well as chromosome segregation. In this course, the students will learn how to read and digest scientific papers, and to present them in front of the members of the laboratory. It is important to criticize the paper, and discuss the experiments and the conclusions with other people.
Learning Goals	The students will be able to understand the outcome of their experiments, present their findings in a logical way, and discuss them with other people.
Requirements, Prerequisites	
Special Note	
Class Plan	1-7: Journal Club, Presentation and discussion of the hot papers. 8-15: Progress reports, Presentation and discussion of the proceedings of the research.
Independent Study Outside of Class	
Textbooks	
References	Papers that have been published by the top journals including nature, science cell.
Grading Policy	50% the contribution to the discussion. 50% the skill to read and present the paper and the research.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S403
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KAKIMOTO Tatsuo Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	The aim of this course is to teach knowledge of plant development, ways of scientific thinking, and research skills.
Learning Goals	Students will be able to be a professional researcher.
Requirements, Prerequisites	Students should be motivated for research.
Special Note	
Class Plan	Session1-15 Experiments and presentation
Independent Study Outside of Class	Students read papers related to research subject, and make research plan.
Textbooks	
References	
Grading Policy	Grading will be made based on the degree of devotion to research and performance.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S423
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TSUKAHARA Satoshi Office:
Office Hours	
Eligibility	Chemistry, Master course 1,2 Compulsory elective
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Others
Course Objective	Presentation of study results and discussion Deep understanding of recent topics on analytical chemistry
Learning Goals	You can show your research to lab. members in detail. You can discuss your results from the scientific viewpoints You can propose some new methods based on your results. You can read recent articles on analytical chemistry, and talk the contents easily to lab members.
Requirements, Prerequisites	
Special Note	
Class Plan	Studies on analytical chemistry for interface, separation of microparticles in electric or magnetic field, and spectroscopy of chiral compounds
Independent Study Outside of Class	(Before seminar) You should calculate and analysis your results in advance. You should prepare your presentation documents fully. You should read recent articles on analytical chemistry fully and think about the results and discussion. (After seminal) You should recall questions and your answers, and check the performance by yourself. If you have only insufficient answers, you should give sufficient answers.
Textbooks	
References	
Grading Policy	Evaluation with attendance, results, presentation, and discussion
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S378
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KUBO Takashi Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	On the basis of knowledge taken in undergraduate lectures, students will work on research of advanced structural organic chemistry.
Learning Goals	Students will be able to read scientific papers critically, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Experimental works 5. Presentation of the progress in individual scientific researches 6. Discussion
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S430
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FURUKAWA Takahisa Office:
Office Hours	At any time upon request.
Eligibility	SISC students
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Students intensively read important research papers in various research fields, including neuroscience, developmental biology, molecular biology, and biochemistry, to acquire deep knowledge of the field, and learn how to “constructively and critically read” research papers.
Learning Goals	Students can acquire basic knowledge of various research fields, including neuroscience, developmental biology, molecular biology, and biochemistry.
Requirements, Prerequisites	
Special Note	
Class Plan	Students read a research paper in detail, and present its content and discuss about it with faculties and other students.
Independent Study Outside of Class	
Textbooks	Not specifically designated.
References	
Grading Policy	Attendance and performance of presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S431
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUJIWARA Toshimichi Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	
Course Objective	Biological phenomena are based on the structure and the interaction of biological molecules. We will study the biology for the analysis of biomolecular structure and the related biological functions by biophysical methods. These studies need the experimental techniques for biological sample preparation and understanding of biology. Thus we will learn advanced biology at molecular levels as well as the methods based on chemistry and physics.
Learning Goals	Student can read research papers on physical biology
Requirements, Prerequisites	Basic biology, chemistry and physics as studied in undergraduate courses
Special Note	
Class Plan	This will be shown in the class.
Independent Study Outside of Class	Read review papers on Bioscience based on physical chemistry
Textbooks	Textbooks on Biological NMR, Biochemistry and Physical Biology
References	
Grading Policy	Results and process for the study, presentation of the research paper will be evaluated.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S432
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TAKAGI Junichi Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	How things work? - This is the question most, if not all, scientists are eager to answer. Our passion is to unravel the mechanism of function of proteins in a living organism where they work as small molecular machines with a remarkable precision. Through the seminar, students are expected to develop capability for understanding structural biology techniques and principles, and to gain skills to give scientific presentations in a well organized manner. Particular emphasis is put on the molecular interactions between cell surface receptors and their extracellular ligands implicated in the signal transduction in a wide variety of biological contexts, ranging from development, neurobiology, and immunity.
Learning Goals	To be able to understand the basics of structural biology and to present data and ideas in a scientific way.
Requirements, Prerequisites	Attend lab seminars and give presentations in front of the lab members.
Special Note	
Class Plan	Lab seminar will be held regularly at 2 weeks interval. Several ad hoc presentations/discussions will also be held.
Independent Study Outside of Class	Paper search on the relevant areas using PUBMED database and reading them to learn the up-to-date information about the structural biology/protein biotechnology.
Textbooks	
References	
Grading Policy	Evaluated based on the performance at the lab seminar in presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S336
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	NAKATANI Kazuhiko Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Issues regarding genome chemistry will be discussed by learning the background. Students will gain the ability to design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Learning Goals	Issues regarding genome chemistry will be discussed by learning the background. Students will gain the ability to design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Requirements, Prerequisites	
Special Note	
Class Plan	
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	Judged by overall performance
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S354
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUJIWARA Toshimichi Office:
Office Hours	Tuesday and Friday Afternoons.
Eligibility	Department of Chemistry / Master Course(Special Integrated Science Course) each academic year Optional
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Biological phenomena are based on the structure and the interaction of biological molecules. We will study the chemistry for the analysis of biomolecular structure and the related biological functions by biophysical methods. These studies need the experimental techniques for biological spectroscopy and understanding of chemical physics. Thus we will learn advanced chemistry especially for the study of biology at molecular levels.
Learning Goals	The students can understand the principles of structural molecular biology especially based on spectroscopic methods. They can apply the principles to the experimental studies of biomolecular systems.
Requirements, Prerequisites	Basic biology, chemistry and physics as studied in undergraduate courses
Special Note	Topics are related to the study of structure and function of biological molecules by methods for structural biology. The methods for magnetic resonance experiments and computer analysis using chemistry and physics are important subjects in this course.
Class Plan	This will be shown in the class.
Independent Study Outside of Class	The students should read text books and articles in academic journals which are recommended by faculty members.
Textbooks	This will be shown in the class.
References	This will be shown in the class.
Grading Policy	Results and process for the study, presentation of the research paper will be evaluated.
Other Remarks	Students are required to study actively by themself. Reading of research papers and conducting experiments are not enough. Students should elucidate the relationship between their own research results and what already known.

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S379
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	Masato Okada Office:
Office Hours	9 a.m.-6 p.m.
Eligibility	Master course students M1-M2 required
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Learning the basics of molecular and cellular biology through various experiments using cell cultures and animal models, focusing on the functions of critical signaling molecules, such as protein products of oncogenes and tumor suppressor genes.
Learning Goals	Deepening understanding the molecular basis for intra- and intercellular signal transduction mechanisms related to carcinogenesis.
Requirements, Prerequisites	N/A
Special Note	
Class Plan	
Independent Study Outside of Class	Study the background of own subjects by reading related articles.
Textbooks	Alberts B. 他:Molecular Biology of the Cell, Darnell J. 他:Molecular Cell Biology Weinberg RA: The Biology of Cancer.
References	Will be introduced per experiment as needed.
Grading Policy	Evaluated by in-class attitude, experiment reports, and presentations In-class attitude: 40% Experiment reports: 30% Presentations: 30%
Other Remarks	Attendance at lab meetings is required.

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S401
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	NAKAGAWA Takuro Office:
Office Hours	
Eligibility	Department of Biological Sciences, Special Integrated Science Course (SISC), Graduate School of Science Required
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	The main objective of this course is to learn the molecular mechanisms behind DNA replication, recombination, and DNA damage repair as well as chromosome segregation. In this course, the students will learn how to read and digest scientific papers, and to present them in front of the members of the laboratory. It is important to criticize the paper, and discuss the experiments and the conclusions with other people.
Learning Goals	The students will be able to understand the outcome of their experiments, present their findings in a logical way, and discuss them with other people.
Requirements, Prerequisites	
Special Note	
Class Plan	1-7: Journal Club, Presentation and discussion of the hot papers. 8-15: Progress reports, Presentation and discussion of the proceedings of the research.
Independent Study Outside of Class	
Textbooks	
References	Papers that have been published by the top journals including nature, science cell.
Grading Policy	50% the contribution to the discussion. 50% the skill to read and present the paper and the research.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S418
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUKASE Koichi Office:
Office Hours	
Eligibility	Department of Chemsitry, Maters's Course elective required course
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Students are expected to develop a basic understanding of advanced research areas relevant to natural products chemistry, organic chemistry, and organic biochemistry. Furthermore, guidance regarding specific ways to advance their research and way of thinking is provided. For the master's thesis, guidance and advice about experiments and writing are also provided.
Learning Goals	Fundamental research ability in the field of natural product chemistry, organic chemistry, and bio-organic chemistry will be obtained.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Guidance on advanced research themes relevant to natural products chemistry, organic chemistry, and organic biochemistry is provided. Students study the organic synthesis and structure determination of bioactive molecules from basic compounds to more recent ones. In addition, students develop a better understanding research in organic synthesis, identification of active key structures, elucidation of mechanisms involved in exerting biological activity, or control of biological reactions. In particular, the role of cell-surface sugar chains and glycoconjugates involved in different recognition events in living organisms is discussed. Also, students are expected to improve their ability to organize and present their research results as conference presentations and research articles.
Independent Study Outside of Class	Students are required to study for the research and the seminar during the semester.
Textbooks	
References	
Grading Policy	The final grade is based on a comprehensive evaluation of research, presentations at seminars and conferences, and content of written research papers.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S438
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	HIKIDA Takatoshi Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this seminar is for students to read scientific papers critically, to design and perform scientific research, and to discuss and present the results obtained from the research. The research theme will be determined through discussion with the supervisor. The guidance and advice for preparation of the Master thesis are also carried out in the seminar.
Learning Goals	The objective of this seminar is to comprehend the background knowledge and experimental techniques to perform the scientific research and to write the Master thesis.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Presentation of the progress in individual scientific researches 5. Preparation and presentation of the master thesis In the sequential Semestral Seminars, the subjects 1 and 2 are taken in the first Seminar, and the subject 5 in the last Seminar.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S382
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KUBO Takashi Office: KAGAKUSENKOKYOMUIIN Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	On the basis of knowledge taken in undergraduate lectures, students will work on research of advanced structural organic chemistry.
Learning Goals	Students will be able to read scientific papers critically, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Experimental works 5. Presentation of the progress in individual scientific researches 6. Discussion
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S412
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	SHINOHARA Akira Office:
Office Hours	Anytime is available in Room 707 in 7th floor of IPR
Eligibility	Department of Biological Sciences / Doctor Course(Special Integrated Science Course) each academic year (1st, 2nd and 3d year of the course) Required to take 「Seminar for Advanced Researches」 taught by your advisor
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course aims to understand basics of molecular biology and molecular genetics using the elaborate genetics systems such as budding yeast. We will particularly focusing on the mechanisms of DNA transaction such as DNA recombination and DNA repair as well as related area such as meiosis.
Learning Goals	By reading scientific papers in the field of chromosome biology, students will get the basic skills and disciplines in scientific research. To digest how the experiments are designed with a specific aim and to read the fact in experimental results are one of the most important skills which students get. In addition, having critical attitude to the science is also important in order to be fair on own research.
Requirements, Prerequisites	Basic knowledge on molecular biology and molecular genetics is essential. The experience on research may help the research, but is not essential
Special Note	
Class Plan	1. DNA repair 2 Recombination in mitosis 3 Recombination in meiosis 4 DNA damage checkpoint 5 Histone modification 6 DNA replication 7 Recombination in immune cells 8 Recombination and cancer 9 Recombination and aging 10 Future direction
Independent Study Outside of Class	Reading relevant papers and reviews are essential to sharpen own knowledge.
Textbooks	The Cell 5th edition (Chapter 1-9), B. Alberts
References	Reviews and papers on above-mentioned fields.
Grading Policy	Judged by the active participation to the seminar and writing on ongoing research
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S426
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TAKAGI Shingo Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	To get sound scientific bases of plant cell biology and learn how to do research.
Learning Goals	You will get basic knowledge on plant cell biology and critical way in evaluating scientific subjects including published papers and ongoing projects.
Requirements, Prerequisites	
Special Note	
Class Plan	To get basic knowledge on how plants adopted to abiotic or biotic environment and on the significance of plant behavior and structure, you read a variety of scientific literature and discuss the relevant subjects. To coin original methods to establish your own investigation on undisclosed phenomena, you learn basic techniques for scientific research on plant biology.
Independent Study Outside of Class	
Textbooks	People in each presentation will provide résumé.
References	
Grading Policy	According to attendance, attitude towards debates and discussions, efforts for presentation, and so on.
Other Remarks	Keep in mind what you should do in order to think by yourself.

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S429
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TSUKAHARA Satoshi Office: KAGAKUSENKOKYOMUIIN Office:
Office Hours	
Eligibility	Chemistry, Master course 1,2 Compulsory elective
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Others
Course Objective	Presentation of study results and discussion Deep understanding of recent topics on analytical chemistry
Learning Goals	You can show your research to lab. members in detail. You can discuss your results from the scientific viewpoints You can propose some new methods based on your results. You can read recent articles on analytical chemistry, and talk the contents easily to lab members.
Requirements, Prerequisites	
Special Note	
Class Plan	Studies on analytical chemistry for interface, separation of microparticles in electric or magnetic field, and spectroscopy of chiral compounds
Independent Study Outside of Class	(Before seminar) You should calculate and analysis your results in advance. You should prepare your presentation documents fully. You should read recent articles on analytical chemistry fully and think about the results and discussion. (After seminal) You should recall questions and your answers, and check the performance by yourself. If you have only insufficient answers, you should give sufficient answers.
Textbooks	
References	
Grading Policy	Evaluation with attendance, results, presentation, and discussion
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S334
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	OKUMURA Mitsutaka Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Course objective of this is to understand the theory of quantum chemistry and its application.
Learning Goals	The learning goal is to understand the usage of the quantum chemical calculations.
Requirements, Prerequisites	Basic knowledge of quantum mechanics must be needed.
Special Note	
Class Plan	The topics will be provided depending on the progress.
Independent Study Outside of Class	Please review the distributed materials
Textbooks	
References	I will introduce it during class
Grading Policy	Grading will be done based on the attitude and the achievements.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S335
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	OKUMURA Mitsutaka Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Course objective of this is to understand the theory of quantum chemistry and its application.
Learning Goals	The learning goal is to understand the usage of the quantum chemical calculations.
Requirements, Prerequisites	Basic knowledge of quantum mechanics must be needed.
Special Note	
Class Plan	The topics will be provided depending on the progress.
Independent Study Outside of Class	Please review the distributed materials
Textbooks	
References	I will introduce it during class
Grading Policy	Grading will be done based on the attitude and the achievements.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S357
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	MATSUMOTO Takuya Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	
Course Objective	On the basis of knowledge taken in lectures up to the first year of grduate course, students will work on research of advanced chemistry.
Learning Goals	Students will be able to read scientific papers critically, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Experimental works 5. Presentation of the progress in individual scientific researches 6. Discussion
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S384
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUJIWARA Toshimichi Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	
Course Objective	Biological phenomena are based on the structure and the interaction of biological molecules. We will study the biology for the analysis of biomolecular structure and the related biological functions by biophysical methods. These studies need the experimental techniques for biological sample preparation and understanding of biology. Thus we will learn advanced biology at molecular levels as well as the methods based on chemistry and physics.
Learning Goals	Student can read research papers on physical biology
Requirements, Prerequisites	Basic biology, chemistry and physics as studied in undergraduate courses
Special Note	
Class Plan	This will be shown in the class.
Independent Study Outside of Class	Read review papers on Bioscience based on physical chemistry
Textbooks	Textbooks on Biological NMR, Biochemistry and Physical Biology
References	
Grading Policy	Results and process for the study, presentation of the research paper will be evaluated.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S394
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KONNO Takumi Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this seminar is for students to read scientific papers critically, to design and perform scientific research, and to discuss and present the results obtained from the research. The research theme will be determined through discussion with the supervisor. The guidance and advice for preparation of the Master thesis are also carried out in the seminar. Topic dealt with in this seminar is coordination chemistry.
Learning Goals	Students will be able to understand advanced coordination chemistry. The objective of this seminar is to comprehend the background knowledge and experimental techniques to perform the scientific research and to write the Master thesis.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Presentation of the progress in individual scientific researches 5. Preparation and presentation of the master thesis In the sequential Semestral Seminars, the subjects 1 and 2 are taken in the first Seminar, and the subject 5 in the last Seminar.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S417
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUKASE Koichi Office:
Office Hours	
Eligibility	Department of Chemsitry, Maters's Course elective required course
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Students are expected to develop a basic understanding of advanced research areas relevant to natural products chemistry, organic chemistry, and organic biochemistry. Furthermore, guidance regarding specific ways to advance their research and way of thinking is provided. For the master's thesis, guidance and advice about experiments and writing are also provided.
Learning Goals	Fundamental research ability in the field of natural product chemistry, organic chemistry, and bio-organic chemistry will be obtained.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Guidance on advanced research themes relevant to natural products chemistry, organic chemistry, and organic biochemistry is provided. Students study the organic synthesis and structure determination of bioactive molecules from basic compounds to more recent ones. In addition, students develop a better understanding research in organic synthesis, identification of active key structures, elucidation of mechanisms involved in exerting biological activity, or control of biological reactions. In particular, the role of cell-surface sugar chains and glycoconjugates involved in different recognition events in living organisms is discussed. Also, students are expected to improve their ability to organize and present their research results as conference presentations and research articles.
Independent Study Outside of Class	Students are required to study for the research and the seminar during the semester.
Textbooks	
References	
Grading Policy	The final grade is based on a comprehensive evaluation of research, presentations at seminars and conferences, and content of written research papers.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S427
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	SIGA Sakiko Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Lecture Subject
Course Objective	This lecture gives chronobiological view of animal behavior and physiology, especially importance of the circadian clock to adapt seasons.
Learning Goals	Students will acquire a comprehensive perspective on how biological activities are organized by the circadian rhythm. More specifically, they will be able to understand circadian clock mechanisms in animals; how the circadian clock is involved in photoperiodism for seasonality.
Requirements, Prerequisites	none
Special Note	
Class Plan	1st: circadian rhythm and clock 2nd: molecular and neural mechanisms of circadian clock 3rd: seasonality and photoperiodism 4th: clock underlying insect photoperiodism
Independent Study Outside of Class	Students study reference literature introduced in the class to deepen your understandings.
Textbooks	Documents are distributed by educators in the beginning of each session
References	Chronobiology -biological timekeeping by Dunlap JC et al (ed). Sinauer, 2004
Grading Policy	Active participation to the class (10%) and reports (90%).
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S435
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KON Takahide Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Others
Course Objective	On the basis of knowledge taken in lectures students will work on research of advanced life sciences.
Learning Goals	To be able to read carefully scientific papers in the field of biological sciences, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course contents】 Students will select one of advanced research topics in the laboratory. 【Course plan】 The instructor will indicate the course plan in the laboratory.
Independent Study Outside of Class	Students are required to read scientific papers carefully and to prepare their research proposal and research progress reports.
Textbooks	
References	
Grading Policy	Students will be evaluated by performance of the introduction of scientific papers, the research proposal, and their own research progress.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S332
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KONNO Takumi Office:
Office Hours	anytime
Eligibility	master students 1,2 Optional
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Lecture Subject
Course Objective	Understanding of natural products, such as carbohydrate and protein from the chemical point of view
Learning Goals	Understanding of many biological events based on molecular-molecular interaction.
Requirements, Prerequisites	not require
Special Note	not require
Class Plan	1:what is a carbohydrate 2:what is a oligosaccharide 3:what is a protein 4:what is a glycoprotein 5:oligosaccharide synthesis 6:protein synthesis 7:glycoprotein synthesis
Independent Study Outside of Class	reading of journals
Textbooks	not require
References	nature, science, Journal of american chemical society, Angewandte chime
Grading Policy	repot (100%)
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S333
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KAJIHARA Yasuhiro Office:
Office Hours	anytime
Eligibility	master students 1,2 Optional
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Lecture Subject
Course Objective	Understanding of natural products, such as carbohydrate and protein from the chemical point of view
Learning Goals	Understanding of many biological events based on molecular-molecular interaction.
Requirements, Prerequisites	not require
Special Note	not require
Class Plan	1:Advanced carbohydrate chemistry-1 2: Advanced carbohydrate chemistry-2 3:Advanced oligosaccharide chemistry-1 4:Advanced oligosaccharide chemistry-2 5:Advanced protein chemistry-1 6:Advanced protein chemistry-2 7:Advanced glycoprotein chemistry-1 8:Advanced glycoprotein chemistry-2 9:Advanced glycoconjugate synthesis-1 10:Advanced glycoconjugate synthesis-2 11:Protein folding-1 12:Protein folding-2 13:posttoranslational modification-1 14:posttoranslational modification-2 15:posttoranslational modification-3
Independent Study Outside of Class	reading of journals
Textbooks	not require
References	nature, science, Journal of american chemical society, Angewandte chime
Grading Policy	report (100%)
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S356
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	MATSUMOTO Takuya Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	
Course Objective	On the basis of knowledge taken in lectures up to the undergraduate course, students will work on research of advanced chemistry.
Learning Goals	Students will be able to read scientific papers critically, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Experimental works 5. Presentation of the progress in individual scientific researches 6. Discussion
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S383
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FURUKAWA Takahisa Office:
Office Hours	At any time upon request.
Eligibility	SISC students M1,2 Optional Required
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Students intensively read important research papers in various research fields, including neuroscience, developmental biology, molecular biology, and biochemistry, to acquire deep knowledge of the field, and learn how to “constructively and critically read” research papers.
Learning Goals	Students can acquire basic knowledge of various research fields, including neuroscience, developmental biology, molecular biology, and biochemistry.
Requirements, Prerequisites	
Special Note	
Class Plan	Students read a research paper in detail, and present its content and discuss about it with faculties and other students.
Independent Study Outside of Class	Students are supposed to read designated textbooks and research reviews.
Textbooks	Not specifically designated.
References	
Grading Policy	Attendance and performance of presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S380
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	Masato Okada Office:
Office Hours	9 a.m.-6 p.m.
Eligibility	Master course students M1-M2 required
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Learning the basics of molecular and cellular biology through various experiments using cell cultures and animal models, focusing on the functions of critical signaling molecules, such as protein products of oncogenes and tumor suppressor genes.
Learning Goals	Deepening understanding the molecular basis for intra- and intercellular signal transduction mechanisms related to carcinogenesis.
Requirements, Prerequisites	N/A
Special Note	
Class Plan	
Independent Study Outside of Class	Study the background of own subjects by reading related articles.
Textbooks	Alberts B. 他:Molecular Biology of the Cell, Darnell J. 他:Molecular Cell Biology Weinberg RA: The Biology of Cancer.
References	Will be introduced per experiment as needed.
Grading Policy	Evaluated by in-class attitude, experiment reports, and presentations In-class attitude: 40% Experiment reports: 30% Presentations: 30%
Other Remarks	Attendance at lab meetings is required.

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S411
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	SHINOHARA Akira　Office:
Office Hours	Anytime is available in Room 707 in 7th floor of IPR
Eligibility	Department of Biological Sciences / Doctor Course(Special Integrated Science Course) each academic year (1st, 2nd, 3rd year etc)　Required to take「Seminar for Advanced Researches」 taught by your advisor
Schedule	Spring and Summer Term　Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course aims to understand basics of molecular biology and molecular genetics using the elaborate genetics systems such as budding yeast. We will particularly focusing on the mechanisms of DNA transaction such as DNA recombination and DNA repair as well as related area such as meiosis.
Learning Goals	By reading scientific papers in the field of chromosome biology, students will get the basic skills and disciplines in scientific research. To digest how the experiments are designed with a specific aim and to read the fact in experimental results are one of the most important skills which students get. In addition, having critical attitude to the science is also important in order to be fair on own research.
Requirements, Prerequisites	Basic knowledge on molecular biology and molecular genetics is essential. The experience on research may help the research, but is not essential
Special Note	
Class Plan	1. DNA repair 2 Recombination in mitosis 3 Recombination in meiosis 4 DNA damage checkpoint 5 Histone modification 6 DNA replication 7 Recombination in immune cells 8 Recombination and cancer 9 Recombination and aging 10 Future direction
Independent Study Outside of Class	Reading scientific papers and reviews are essential to deepen the knowledge.
Textbooks	The Cell 5th edition (Chapter 1-9), B. Alberts
References	Reviews and papers on above-mentioned fields.
Grading Policy	Judged by the active participation to the seminar and writing on ongoing research
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S424
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TAKAGI Junichi Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	How things work? - This is the question most, if not all, scientists are eager to answer. Our passion is to unravel the mechanism of function of proteins in a living organism where they work as small molecular machines with a remarkable precision. Through the seminar, students are expected to develop capability for understanding structural biology techniques and principles, and to gain skills to give scientific presentations in a well organized manner. Particular emphasis is put on the molecular interactions between cell surface receptors and their extracellular ligands implicated in the signal transduction in a wide variety of biological contexts, ranging from development, neurobiology, and immunity.
Learning Goals	To be able to understand the basics of structural biology and to present data and ideas in a scientific way.
Requirements, Prerequisites	Attend lab seminars and give presentations in front of the lab members.
Special Note	
Class Plan	Lab seminar will be held regularly at 2 weeks interval. Several ad hoc presentations/discussions will also be held.
Independent Study Outside of Class	Paper search on the relevant areas using PUBMED database and reading them to learn the up-to-date information about the structural biology/protein biotechnology.
Textbooks	
References	
Grading Policy	Evaluated based on the performance at the lab seminar in presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Chemistry)

Course Code	24S425
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KAJIHARA Yasuhiro Office:
Office Hours	anytime
Eligibility	master students 1,2 Optional
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Lecture Subject
Course Objective	Understanding of natural products, such as carbohydrate and protein from the chemical point of view
Learning Goals	Understanding of many biological events based on molecular-molecular interaction.
Requirements, Prerequisites	not require
Special Note	not require
Class Plan	1:Advanced carbohydrate chemistry-1 2: Advanced carbohydrate chemistry-2 3:Advanced oligosaccharide chemistry-1 4:Advanced oligosaccharide chemistry-2 5:Advanced protein chemistry-1 6:Advanced protein chemistry-2 7:Advanced glycoprotein chemistry-1 8:Advanced glycoprotein chemistry-2 9:Advanced glycoconjugate synthesis-1 10:Advanced glycoconjugate synthesis-2 11:Protein folding-1 12:Protein folding-2 13:posttoranslational modification-1 14:posttoranslational modification-2 15:posttoranslational modification-3
Independent Study Outside of Class	reading of journals
Textbooks	not require
References	nature, science, Journal of american chemical society, Angewandte chime
Grading Policy	repot (100%)
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S433
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	TAKAGI Shingo Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	To get sound scientific bases of plant cell biology and learn how to do research.
Learning Goals	You will get basic knowledge on plant cell biology and critical way in evaluating scientific subjects including published papers and ongoing projects.
Requirements, Prerequisites	
Special Note	
Class Plan	To get basic knowledge on how plants adopted to abiotic or biotic environment and on the significance of plant behavior and structure, you read a variety of scientific literature and discuss the relevant subjects. To coin original methods to establish your own investigation on undisclosed phenomena, you learn basic techniques for scientific research on plant biology.
Independent Study Outside of Class	
Textbooks	People in each presentation will provide résumé.
References	
Grading Policy	According to attendance, attitude towards debates and discussions, efforts for presentation, and so on.
Other Remarks	Keep in mind what you should do in order to think by yourself.

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S436
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	MATSUNO Kenji Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	We will learn genetic and molecular bases of cell functions and animal development.
Learning Goals	Ability for understanding publications on developmental biology and cell biology.
Requirements, Prerequisites	Basic knowledge of cell biology and developmental biology are required.
Special Note	
Class Plan	Several presentations in one semester
Independent Study Outside of Class	Reading papers
Textbooks	Selected papaers
References	
Grading Policy	Presentation
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S437
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	MATSUNO Kenji Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	We will learn genetic and molecular bases of cell functions and animal development.
Learning Goals	Ability for understanding publications on developmental biology and cell biology.
Requirements, Prerequisites	Basic knowledge of cell biology and developmental biology are required.
Special Note	
Class Plan	Several presentation in a semester
Independent Study Outside of Class	Reading papers
Textbooks	Selected papers
References	
Grading Policy	Presentation
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S355
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	FUJIWARA Toshimichi Office:
Office Hours	Tuesday and Friday Afternoons.
Eligibility	Department of Chemistry / Master Course(Special Integrated Science Course) Each academic year
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Biological phenomena are based on the structure and the interaction of biological molecules. We will study the analysis of biomolecular structure and the related biological functions by biophysical methods such as magnetic resonance spectroscopy. These studies need the experimental techniques for biological sample preparation and spectroscopy in addition to theoretical analysis of the data. Thus we will learn advanced chemistry and physics for biology at molecular levels
Learning Goals	The students can understand the principles of structural molecular biology especially based on spectroscopic methods. They can apply the principles to the experimental studies of biomolecular systems.
Requirements, Prerequisites	Basic biology, chemistry and physics as studied in undergraduate courses.
Special Note	Major theme will be determined in discussion with instructors. Topics are related to the study of structure and function of biological molecules by methods for structural biology such as NMR. The methods for sample preparation, magnetic resonance experiments and computer analysis of the data are important subjects in this course.
Class Plan	This will be shown in the class.
Independent Study Outside of Class	The students should read text books and articles in academic journals which are recommended by faculty members.
Textbooks	This will be shown in the class.Textbooks on Biological NMR, Biochemistry and Physical Biology
References	This will be shown in the class.
Grading Policy	Results and process for the study, presentation of the results and the research paper will be evaluated.
Other Remarks	Students are required to study actively by themself. Reading of research papers and conducting experiments are not enough. Students should elucidate the relationship between their own research results and what already known. They should make their own hypothesis based on the investigation and discussion with instructors and students.

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S360
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	HIKIDA Takatoshi Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this seminar is for students to read scientific papers critically, to design and perform scientific research, and to discuss and present the results obtained from the research. The research theme will be determined through discussion with the supervisor. The guidance and advice for preparation of the Master thesis are also carried out in the seminar.
Learning Goals	The objective of this seminar is to comprehend the background knowledge and experimental techniques to perform the scientific research and to write the Master thesis.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Orientation 2. Research proposal 3. Critical reading of scientific papers 4. Presentation of the progress in individual scientific researches 5. Preparation and presentation of the master thesis In the sequential Semestral Seminars, the subjects 1 and 2 are taken in the first Seminar, and the subject 5 in the last Seminar.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Evaluated by performance of the introduction of scientific papers, the research proposal, and the presentation of research progress.
Other Remarks	

(SISC)Semestral Seminar(Spring and Summer Semester) (Biological Sciences)

Course Code	24S402
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KAKIMOTO Tatsuo Office:
Office Hours	
Eligibility	
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	The aim of this course is to teach knowledge of plant development, ways of scientific thinking, and research skills.
Learning Goals	Students will be able to be a professional researcher.
Requirements, Prerequisites	Students should be motivated for research.
Special Note	
Class Plan	Session1-5 Learning basic research skills Session6-15 Experiments
Independent Study Outside of Class	Students should read related papers, and make research plan.
Textbooks	
References	
Grading Policy	Grading will be made based on the degree of devotion to research and performance.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Biological Sciences)

Course Code	24S428
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	KON Takahide Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Others
Course Objective	On the basis of knowledge taken in lectures students will work on research of advanced life sciences.
Learning Goals	To be able to read carefully scientific papers in the field of biological sciences, to perform the scientific research, and to present the research results.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course contents】 Students will select one of advanced research topics in the laboratory. 【Course plan】 The instructor will indicate the course plan in the laboratory.
Independent Study Outside of Class	Students are required to read scientific papers carefully and to prepare their research proposal and research progress reports.
Textbooks	
References	
Grading Policy	Students will be evaluated by performance of the introduction of scientific papers, the research proposal, and their own research progress.
Other Remarks	

(SISC)Interactive Seminar(For Students Enrolled Spring)

Course Code	24S805
Course Number	24CHEM6G014
Credits	1
Instructor	FUNAHASHI Yasuhiro Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Master Course(Special Integrated Science Course) each academic year Chemistry: optional required / Bioscience, Macromolecular Science : optional
Schedule	Full Year Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	This course provides an opportunity to arise an interest in various field of science and to broaden your horizons through the discussion about your research with professors in the field different from yours.
Learning Goals	Students can get the wide-spread interests in science, and general understanding of their research achievements.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Discussion about your research with professors in the field different from your main laboratory. For the discussion, laboratories should be chosen from among the laboratories in department of chemistry, bioscience, and macromolecular Science.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Grading based on the results of the presentation and discussion.
Other Remarks	

(SISC)Semestral Seminar(Fall and Winter Semester) (Chemistry)

Course Code	24S337
Course Number	24CHEM6P200,24BISC5P200,24MASC6P200
Credits	4
Instructor	NAKATANI Kazuhiko Office:
Office Hours	
Eligibility	
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Issues regarding genome chemistry will be discussed by learning the background. Students will gain the ability to design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Learning Goals	Issues regarding genome chemistry will be discussed by learning the background. Students will gain the ability to design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Requirements, Prerequisites	
Special Note	
Class Plan	
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	Judged by overall performance
Other Remarks	

2 Doctor Course

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S422
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	ISHIKAWA Naoto Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Doctor Course(Special Integrated Science Course) each academic year Chemistry: required / Bioscience, Macromolecular Science : optional
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Others
Course Objective	This course provides an opportunity to arise an interest in various field of science and to broaden your horizons through the discussion about your research with professors in the field different from yours.
Learning Goals	
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Discussion about your research with professors in the field different from your main laboratory. For the discussion, laboratories should be chosen from among the laboratories in department of chemistry, bioscience, and macromolecular Science.
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	Grading based on the results of the presentation and discussion.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S030
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	SASAI Hiroaki Office:
Office Hours	
Eligibility	Department of Chemistry / Doctor Course(Special Integrated Science Course) each academic year Required to take 「Seminar for Advanced Researches」 taught by your advisor
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course is essential to receive Ph.D. degree.
Learning Goals	Discovery of a novel reaction or synthesis of target molecules and presentation of these research results.
Requirements, Prerequisites	none
Special Note	
Class Plan	carry out experimental research and presentation of the results at the seminar.
Independent Study Outside of Class	experimental work (everyday)
Textbooks	The requisite text books and/or articles will be provided individually.
References	
Grading Policy	based on the research results and skill of presentation
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Biological Sciences)

Course Code	24S389
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	KAKIMOTO Tatsuo Office:
Office Hours	
Eligibility	
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	The aim of this course is to teach knowledge of plant development, ways of scientific thinking, and research skills.
Learning Goals	Students will be able to be a professional researcher.
Requirements, Prerequisites	Students should be motivated for research.
Special Note	
Class Plan	Session1-5 Discussion on Plant Science Session6-10 Basic techniques for plant science research Session 11-15 Advances research in plant science
Independent Study Outside of Class	Students should read related papers.
Textbooks	
References	
Grading Policy	Grading will be made based on the degree of devotion to research and performance.
Other Remarks	

(SISC)Interactive Seminar for Advanced Research(Fall)

Course Code	24S408
Course Number	24CHEM6G014
Credits	1
Instructor	FUNAHASHI Yasuhiro Office: HASHIZUME Akihito Office: TAKAGI Shingo Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Doctor Course(Special Integrated Science Course) each academic year Chemistry: required / Bioscience, Macromolecular Science : optional
Schedule	Fall and Winter Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	This course provides an opportunity to arise an interest in various field of science and to broaden your horizons through the discussion about your research with professors in the field different from yours.
Learning Goals	Students can get the wide-spread interests in science, and general understanding of their research achievements.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Discussion about your research with professors in the field different from your main laboratory. For the discussion, laboratories should be chosen from among the laboratories in department of chemistry, bioscience, and macromolecular Science.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Grading based on the results of the presentation and discussion.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Chemistry)

Course Code	24S814
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	KAJIHARA Yasuhiro Office:
Office Hours	Send E-mail to fix discussion time.
Eligibility	Doctoral course students D1-3 Required
Schedule	Full Year Period: Other
Room	その他
Type of Class	Lecture Subject
Course Objective	Natural products such as carbohydrate and proteins have a complex structure. In order to understand their biological function and structure, their chemistry and biology will be discussed
Learning Goals	understanding of the function of natural products such as carbohydrate and protein
Requirements, Prerequisites	PhD students
Special Note	

Class Plan	Students study several papers and then present 1. Professor demonstrate seminar-1 2. Professor demonstrate seminar-2 3. Professor demonstrate seminar-3 4. Professor demonstrate seminar-4 5. Student-1 presentation 6. Student-2 presentation 7. Student-3 presentation 8. Student-4 presentation 9. Student-5 presentation 10. Student-6 presentation 11. Student-7 presentation 12. Student-8 presentation 13. Student-9 presentation 14. Student-10 presentation 15. Student-11 presentation 16. Student-12 presentation 17. Student-13 presentation 18. Student-14 presentation 19. Student-15 presentation 20. Student-16 presentation 21. Student-17 presentation 22. Student-18 presentation 23. Student-19 presentation 24. Student-20 presentation 25. Student-21 presentation 26. Student-22 presentation 27. Student-23 presentation 28. Student-24 presentation 29. Student-25 presentation 30. Student-26 presentation
Independent Study Outside of Class	Journals
Textbooks	Papers will be given
References	American chemical Society
Grading Policy	reports
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Macromolecular Science)

Course Code	24S385
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	HASHIZUME Akihito Office:
Office Hours	Saturday, 3pm-
Eligibility	Department of Macromolecular Science D1 to D3 Optionally required
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Others
Course Objective	This course will provide advanced information, concept, and techniques for on-going/future researches in macromolecular science. Students will prepare a research proposal, do experiments, deal with experimental data, prepare reports, and have presentations on their own research to prepare their own Ph.D. thesis.
Learning Goals	This course is aimed to enable graduate students to learn basic concepts and experimental and presentation skills necessary for preparation their Ph.D. thesis.
Requirements, Prerequisites	
Special Note	
Class Plan	Students do front research on their own project concerning macromolecular science. Students present their progresses on the research project, explain related papers, and prepare weekly and monthly reports.
Independent Study Outside of Class	Students are required to read and study books, references, and original papers concerning their own research.
Textbooks	Not specified.
References	Appropriate references will be indicated during research.
Grading Policy	Comprehensively evaluated by attitude, results, and reports.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Macromolecular Science)

Course Code	24S388
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	KURISU Genji Office:
Office Hours	Anytime with prior appointment
Eligibility	Department of Macromolecular Science / Doctor Course (Special Integrated Science Course) 1st, 2nd and 3rd academic year Optional
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Three-dimensional protein structure brings us a deeper insight into the biological function. X-ray crystallography is the best method to determine atomic coordinates of protein molecules. The main aim of this course is understanding of the integrated structural biology; 1) Principles of protein crystallography, 2) Analysis of the obtained X-ray structure of the biological macromolecular assemblies, 3) Including basic biochemistry of protein complexes in order to elucidate the molecular mechanism of the highly organized biological processes at atomic level.
Learning Goals	Students can interpret the modern structural biology papers, including X-ray crystallography, NMR spectroscopy, cryo-TEM analysis, and can present his/her own opinion on them.
Requirements, Prerequisites	Fundamental background of physical chemistry, biochemistry and molecular biology
Special Note	NONE
Class Plan	【Course Content】 The course consists of 15 lectures. It covers all of the material requested in X-ray structural biology; cloning, protein expression and purification; crystallisation; X-ray data collection; solving the phase problem; phase refinement; getting a macromolecular model; structure validation, analysis and presentation. 【Class plan】 Lecture 1 is the Introduction to the structural biology. Lectures 2-9 will discuss the recently published articles in structural biology summarised by students. In these lectures and in most of the presented articles, the concepts and experimental examples of modern protein crystallogrpahy are included. In Lectures 10-14, students will present their own research progress in structural biology. All lab members including faculties will discuss about their results and presentations. Lecture 15 is the overall discussion throughout the whole year.
Independent Study Outside of Class	Referring the Protein Data Bank using graphic computer is highly recommended when reading the articles on the topics and preparing the presentation on it.

Textbooks	instructed at every opportunity
References	Biomolecular Crystallography, Bernhard Rupp, Garland Science 2010.
Grading Policy	Considering the presentation and discussion
Other Remarks	NONE

(SISC)Interactive Seminar for Advanced Research(Spring)

Course Code	24S407
Course Number	24CHEM6G014
Credits	1
Instructor	FUNAHASHI Yasuhiro Office: HASHIZUME Akihito Office: TAKAGI Shingo Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Doctor Course(Special Integrated Science Course) each academic year Chemistry: required / Bioscience, Macromolecular Science : optional
Schedule	Spring and Summer Term Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	This course provides an opportunity to arise an interest in various field of science and to broaden your horizons through the discussion about your research with professors in the field different from yours.
Learning Goals	Students can get the wide-spread interests in science, and general understanding of their research achievements.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 Discussion about your research with professors in the field different from your main laboratory. For the discussion, laboratories should be chosen from among the laboratories in department of chemistry, bioscience, and macromolecular Science.
Independent Study Outside of Class	Students are required to read scientific papers critically and to prepare the research proposal and the presentation of the research progress.
Textbooks	
References	
Grading Policy	Grading based on the results of the presentation and discussion.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Chemistry)

Course Code	24S326
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	TSUKAHARA Satoshi Office:
Office Hours	
Eligibility	Chemistry, Doctoral course 1,2,3 Compulsory elective
Schedule	Full Year Period: Other
Room	その他
Type of Class	Others
Course Objective	Presentation of study results and deep discussion Future planing of research by oneself Deep understanding of recent topics on analytical chemistry
Learning Goals	You can show your research to lab. members in detail. You can discuss your results from the scientific viewpoints You can propose some new methods based on your results. You can read recent articles on analytical chemistry, and talk the contents easily to lab members.
Requirements, Prerequisites	
Special Note	
Class Plan	Studies on analytical chemistry for interface, separation of microparticles in electric or magnetic field, and spectroscopy of chiral compounds to construct new field of analytical chemistry.
Independent Study Outside of Class	(Before seminar) You should calculate and analysis your results in advance. You should prepare your presentation documents fully. You should read recent articles on analytical chemistry fully and think about the results and discussion. (After seminal) You should recall questions and your answers, and check the performance by yourself. If you have only insufficient answers, you should give sufficient answers.
Textbooks	
References	
Grading Policy	Evaluation with attendance, results, presentation, and discussion
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S330
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	TSUKAHARA Satoshi Office:
Office Hours	
Eligibility	Chemistry, Doctoral course 1,2,3 Compulsory elective
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Others
Course Objective	Presentation of study results and deep discussion Future planing of research by oneself Deep understanding of recent topics on analytical chemistry
Learning Goals	You can show your research to lab. members in detail. You can discuss your results from the scientific viewpoints You can propose some new methods based on your results. You can read recent articles on analytical chemistry, and talk the contents easily to lab members.
Requirements, Prerequisites	
Special Note	
Class Plan	Studies on analytical chemistry for interface, separation of microparticles in electric or magnetic field, and spectroscopy of chiral compounds to construct new field of analytical chemistry.
Independent Study Outside of Class	(Before seminar) You should calculate and analysis your results in advance. You should prepare your presentation documents fully. You should read recent articles on analytical chemistry fully and think about the results and discussion. (After seminal) You should recall questions and your answers, and check the performance by yourself. If you have only insufficient answers, you should give sufficient answers.
Textbooks	
References	
Grading Policy	Evaluation with attendance, results, presentation, and discussion
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Biological Sciences)

Course Code	24S811
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	SHINOHARA Akira Office:
Office Hours	Anytime is available in Room 707 in 7th floor of IPR
Eligibility	Department of Biological Sciences / Doctor Course(Special Integrated Science Course) each academic year (1st, 2nd, 3r year of the course) Required to take 「Seminar for Advanced Researches」 taught by your advisor
Schedule	Full Year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course aims to understand basics of molecular biology and molecular genetics using the elaborate genetics systems such as budding yeast. We will particularly focusing on the mechanisms of DNA transaction such as DNA recombination and DNA repair as well as related area such as meiosis.
Learning Goals	By reading scientific papers in the field of chromosome biology, students will get the basic skills and disciplines in scientific research. To digest how the experiments are designed with a specific aim and to read the fact in experimental results are one of the most important skills which students get. In addition, having critical attitude to the science is also important in order to be fair on own research.
Requirements, Prerequisites	Basic knowledge on molecular biology and molecular genetics is essential. The experience on research may help the research, but is not essential
Special Note	
Class Plan	1. DNA repair 2 Recombination in mitosis 3 Recombination in meiosis 4 DNA damage checkpoint 5 Histone modification 6 DNA replication 7 Recombination in immune cells 8 Recombination and cancer 9 Recombination and aging 10 Future direction
Independent Study Outside of Class	Reading papers and reviews in relevant field such as chromosome biology are essential to deepen the knowledge.
Textbooks	The Cell 5th edition (Chapter 1-9), B. Alberts
References	Reviews and papers on above-mentioned fields.
Grading Policy	Judged by the active participation to the seminar and writing on ongoing research
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Biological Sciences)

Course Code	24S812
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	MATSUNO Kenji Office:
Office Hours	
Eligibility	
Schedule	Full Year Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this lecture is to discuss how proper animal development is achieved.
Learning Goals	Ability for understanding publications on developmental biology and cell biology.
Requirements, Prerequisites	Knowledge of basic biology is required.
Special Note	
Class Plan	Several presentations in a semester.
Independent Study Outside of Class	Reading papers
Textbooks	
References	
Grading Policy	Presentation
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Biological Sciences)

Course Code	24S818
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	NAKAGAWA Takuro Office: C512, A414 Phone: 5432 Email : takuro4@bio.sci.osaka-u.ac.jp
Office Hours	
Eligibility	Department of Biological Sciences, Special Integrated Science Course (SISC), Graduate School of Science Required
Schedule	Full Year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	The main objective of this course is to learn the molecular mechanisms behind DNA replication, recombination, and DNA damage repair as well as chromosome segregation. In this course, the students will learn how to read and digest scientific papers, and to present them in front of the members of the laboratory. It is important to criticize the paper, and discuss the experiments and the conclusions with other people.
Learning Goals	The students will be able to understand the outcome of their experiments, present their findings in a logical way, and discuss them with other people.
Requirements, Prerequisites	
Special Note	
Class Plan	1-7: Journal Club, Presentation and discussion of the hot papers. 8-15: Progress reports, Presentation and discussion of the proceedings of the research.
Independent Study Outside of Class	
Textbooks	
References	Papers that have been published by the top journals including nature, science cell.
Grading Policy	50% the contribution to the discussion. 50% the skill to read and present the paper and the research.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Biological Sciences)

Course Code	24S415
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	KURISU Genji Office:
Office Hours	Anytime with prior appointment
Eligibility	Department of Biological Sciences / Doctor Course (Special Integrated Science Course) 1st, 2nd and 3rd academic year Optional
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	Three-dimensional protein structure brings us a deeper insight into the biological function. X-ray crystallography is the best method to determine atomic coordinates of protein molecules. The main aim of this course is understanding of the integrated structural biology; 1) Principles of protein crystallography, 2) Analysis of the obtained X-ray structure of the biological macromolecular assemblies, 3) Including basic biochemistry of protein complexes in order to elucidate the molecular mechanism of the highly organized biological processes at atomic level.
Learning Goals	Students can interpret the modern structural biology papers, including X-ray crystallography, NMR spectroscopy, cryo-TEM analysis, and can present his/her own opinion on them.
Requirements, Prerequisites	Fundamental background of physical chemistry, biochemistry or molecular biology
Special Note	NONE
Class Plan	【Course Content】 The course consists of 15 lectures. It covers all of the material requested in X-ray structural biology; cloning, protein expression and purification; crystallisation; X-ray data collection; solving the phase problem; phase refinement; getting a macromolecular model; structure validation, analysis and presentation. 【Class plan】 Lecture 1 is the Introduction to the structural biology. Lectures 2-9 will discuss the recently published articles in structural biology summarised by students. In these lectures and in most of the presented articles, the concepts and experimental examples of modern protein crystallogrpahy are included. In Lectures 10-14, students will present their own research progress in structural biology. All lab members including faculties will discuss about their results and presentations. Lecture 15 is the overall discussion throughout the whole year.
Independent Study Outside of Class	Referring the Protein Data Bank using graphic computer is highly recommended when reading the articles on the topics and preparing the presentation on it.

Textbooks	instructed at every opportunity
References	Biomolecular Crystallography, Bernhard Rupp, Garland Science 2010.
Grading Policy	Considering the presentation and discussion
Other Remarks	NONE

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S414
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	FUKASE Koichi Office:
Office Hours	
Eligibility	Department of Chemsitry, Doctoral Course Required to take 「Seminar for Advanced Researches」 taught by your advisor
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course is aimed to cultivate researchers with broader perspective and critical thinking abilities through research guidance for advanced studies related to natural products chemistry, organic chemistry, and organic biochemistry. Guidance and advice are also provided when students write up their research results into a doctoral thesis.
Learning Goals	Research ability in the field of natural product chemistry, organic chemistry, and bio-organic chemistry will be obtained.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 This course is reuired to obtain dobtoral degree. The specific theme is determined through consultation with the supervisor. Typical research subjects span a variety of topics. Students are expected to conduct research to clarify the function and role of molecules involved in important biological phenomena including defense mechanisms such as immunity, infection, allergy and oncogenic transformation, and homeostasis. Some students conduct research aimed at identification of active key structures, elucidation of the mechanisms responsible for biological activity, or control of biological reactions by using mainly organic synthetic chemistry approaches. For example, a major area of study is the involvement of cell-surface sugar chains and glycoconjugates in different recognition mechanisms in living organism. Some students work on the development of new labeling and imaging techniques to clarify the dynamic behavior of biomolecules in living organisms.
Independent Study Outside of Class	Students are required to study for the research and the seminar during the semester.
Textbooks	
References	
Grading Policy	The final grade is based on a comprehensive evaluation of research, presentations at seminars and conferences, and content of written research papers.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Macromolecular Science)

Course Code	24S803
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	SATO Takahiro Office:
Office Hours	
Eligibility	
Schedule	Full Year Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this seminar is for the student to design and perform scientific research, and to discuss and present the results obtained from the research. The research will be performed with advice of the supervisor.
Learning Goals	The student will obtain the ability of researchers, i.e., searching the research theme, designing the research plan, performing the research, and preparing scientific papers.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Searching the research theme 2. Designing the research plan 3. Performing the research 4. Preparing the scientific paper
Independent Study Outside of Class	The tasks listing in the Class Plan will be done also outside of class.
Textbooks	
References	
Grading Policy	Evaluated by performance of the research and the scientific papers prepared.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Biological Sciences)

Course Code **Course Number**	24S809 24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	Masato Okada Office:
Office Hours	9 a.m.-6 p.m.
Eligibility	Doctor course students, Department of Biological Sciences All grade Optional Required
Schedule	Full Year Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Learning the basics of molecular and cellular biology through various experiments using cell cultures and animal models, focusing on the functions of critical signaling molecules, such as protein products of oncogenes and tumor suppressor genes.
Learning Goals	Deepening understanding the molecular basis for intra- and intercellular signal transduction mechanisms related to carcinogenesis.
Requirements, Prerequisites	N/A
Special Note	Main topic of the studies are structural biology of proteins, protein complexes, viruses etc and development of new methodologies of x-ray crystallography. Detail will be discussed with the lab members.
Class Plan	1. Introduction to Protein Structures 2. Proteins and disease 3. Computational science of protein 4. Bioinformatics 5. Biophysics of protein 6. Mass spectroscopy of proteins 7. Protein Crystallography 8. Electron micrography
Independent Study Outside of Class	Study the background of own subjects by reading related articles.
Textbooks	Alberts B. 他:Molecular Biology of the Cell, Darnell J. 他:Molecular Cell Biology Weinberg RA: The Biology of Cancer.
References	Will be introduced per experiment as needed.
Grading Policy	Evaluated by in-class attitude, experiment reports, and presentations In-class attitude: 40% Experiment reports: 30% Presentations: 30%
Other Remarks	Attendance at lab meetings is required.

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Chemistry)

Course Code	24S813
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	OGAWA Takuji Office:
Office Hours	
Eligibility	
Schedule	Full Year Period: Other
Room	その他
Type of Class	
Course Objective	
Learning Goals	Students search and read published papers related to their research, and present and discuss with the lab. members. They also present results of their own research and discuss.
Requirements, Prerequisites	
Special Note	
Class Plan	
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Spring) (Chemistry)

Course Code	24S816
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	NAKATANI Kazuhiko Office:
Office Hours	
Eligibility	
Schedule	Full Year Period: Other
Room	その他
Type of Class	Experimental Subject
Course Objective	Issues regarding genome chemistry will be searched and proposed by each students. Students will gain the ability to explore the scientifically important and essential issues, design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Learning Goals	Issues regarding genome chemistry will be searched and proposed by each students. Students will gain the ability to explore the scientifically important and essential issues, design the experiments for the understanding essence of these issues, skills for performing the experiments, and knowledge for discussing the results.
Requirements, Prerequisites	
Special Note	
Class Plan	
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	judged by overall performance
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Macromolecular Science)

Course Code	24S817
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	INOUE Tadashi Office:
Office Hours	
Eligibility	
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	
Course Objective	Protein folding is a process in which an extended polypeptide chain acquires a unique folded conformation with biological activity. Clarifying the mechanism of protein folding is essential for improving our understanding of the structure and function of proteins. It is also important because many critical biological processes and disease states involve protein misfolding and aggregation reactions. History, basic concepts and methods and current topics for understanding protein folding and misfolding will be addressed.
Learning Goals	The topics to be introduced and discussed in this seminar are the stability of proteins, the mechanism of protein folding and misfolding, its biological significance, and interactions and forces responsible for protein folding and misfolding. Various physicochemical approaches including CD, fluorescence, NMR, and calorimetry are addressed. Students learn how to read related papers and to prepare original papers.
Requirements, Prerequisites	
Special Note	
Class Plan	1. History of protein sciences 2. Protein folding and misfolding 3. Forces responsible for protein folding and misfolding 4. Thermodynamic stability of proteins 5. Kinetics of protein folding and unfolding 6. Folding diseases
Independent Study Outside of Class	
Textbooks	
References	
Grading Policy	Reports on several specific topics will be evaluated. Examples are: 1. Summarize the mechanism of amyloid fibrillation with Figures (in two pages).
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Biological Sciences)

Course Code	24S329
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	SHINOHARA Akira Office:
Office Hours	Anytime is available in Room 707 in 7th floor of IPR
Eligibility	Department of Biological Sciences / Doctor Course(Special Integrated Science Course) each academic year (1st or 2nd year) Required to take 「Seminar for Advanced Researches」 taught by your advisor
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course aims to understand basics of molecular biology and molecular genetics using the elaborate genetics systems such as budding yeast. We will particularly focusing on the mechanisms of DNA transaction such as DNA recombination and DNA repair as well as related area such as meiosis.
Learning Goals	By reading scientific papers in the field of chromosome biology, students will get the basic skills and disciplines in scientific research. To digest how the experiments are designed with a specific aim and to read the fact in experimental results are one of the most important skills which students get. In addition, having critical attitude to the science is also important in order to be fair on own research.
Requirements, Prerequisites	Basic knowledge on molecular biology and molecular genetics is essential. The experience on research may help the research, but is not essential
Special Note	
Class Plan	1. DNA repair 2 Recombination in mitosis 3 Recombination in meiosis 4 DNA damage checkpoint 5 Histone modification 6 DNA replication 7 Recombination in immune cells 8 Recombination and cancer 9 Recombination and aging 10 Future direction
Independent Study Outside of Class	Reading relevant papers and reviews are essential to get enough knowledge.
Textbooks	The Cell 5th edition (Chapter 1-9), B. Alberts
References	Reviews and papers on the above related fields.
Grading Policy	Judged by the active participation to the seminar and writing on ongoing research
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S386
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	FUNAHASHI Yasuhiro Office:
Office Hours	
Eligibility	Department of Chemistry, Bioscience, Macromolecular Science / Doctor Course(Special Integrated Science Course) Each academic year Chemistry: required / Bioscience, Macromolecular Science : optional
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Seminar Subject
Course Objective	This course is aimed to cultivate researchers with broader perspective and critical thinking abilities through research guidance for advanced studies related to structuralbiology, inorganic chemistry, coordination chemistry, and organometallic chemistry. Guidance and advice are also provided when students write up their research results into a doctoral thesis.
Learning Goals	Research ability in the related fields of chemistry will be obtained.
Requirements, Prerequisites	
Special Note	
Class Plan	【Course Content】 This course is reuired to obtain dobtoral degree. The specific theme is determined through consultation with the supervisor. Typical research subjects span a variety of topics. Students are expected to conduct research to clarify the function and role of molecules involved in important biological phenomena including defense mechanisms such as immunity, infection, allergy and oncogenic transformation, and homeostasis. Some students conduct research aimed at identification of active key structures, elucidation of the mechanisms responsible for biological activity, or control of biological reactions by using mainly organic synthetic chemistry approaches. For example, a major area of study is the involvement of cell-surface sugar chains and glycoconjugates in different recognition mechanisms in living organism. Some students work on the development of new labeling and imaging techniques to clarify the dynamic behavior of biomolecules in living organisms.
Independent Study Outside of Class	Students are required to study for the research and the seminar during the semester.
Textbooks	
References	
Grading Policy	The final grade is based on a comprehensive evaluation of research, presentations at seminars and conferences, and content of written research papers.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Chemistry)

Course Code	24S404
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	TANIGUCHI Masateru Office:
Office Hours	
Eligibility	
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	
Course Objective	To train researchers to have a broad perspective and flexible thinking power using cutting-edge research in fields related to analytical chemistry, inorganic chemistry, radiation chemistry, and physicochemistry. When summarizing research results as a doctoral thesis, the course aims to provide guidance and advice.
Learning Goals	To enable researchers to understand the academic and social positioning of research and develop research plans themselves and subsequently execute these research plans. In addition, to enable them to summarize and publish research results in papers and presentations and to develop research by discussing with others.
Requirements, Prerequisites	
Special Note	
Class Plan	The lecture content is taught individually in the laboratory. For details regarding research carried out in each laboratory, please refer to the "Department of Chemistry and Department of Studies."
Independent Study Outside of Class	Read research papers on research subjects and related fields and read literature pertaining to different research fields in order to expand the range of knowledge.
Textbooks	
References	
Grading Policy	Comprehensive evaluation based on the contents of research, presentation, and thesis.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Macromolecular Science)

Course Code	24S416
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	SATO Takahiro Office:
Office Hours	
Eligibility	
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	
Course Objective	The aim of this seminar is for the student to design and perform scientific research, and to discuss and present the results obtained from the research. The research will be performed with advice of the supervisor.
Learning Goals	The student will obtain the ability of researchers, i.e., searching the research theme, designing the research plan, performing the research, and preparing scientific papers.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Searching the research theme 2. Designing the research plan 3. Performing the research 4. Preparing the scientific paper
Independent Study Outside of Class	The tasks listing in the Class Plan will be done also outside of class.
Textbooks	
References	
Grading Policy	Evaluated by performance of the research and the scientific papers prepared.
Other Remarks	

(SISC)Seminar for Advanced Researches(For Students Enrolled Fall) (Macromolecular Science)

Course Code	24S387
Course Number	24CHEM7P200,24BISC7P200,24MASC7P200
Credits	9
Instructor	YAMAGUCHI Hiroyasu Office:
Office Hours	
Eligibility	Doctor of Science, Department of Macromolecular Science, Graduate School of Science The 1st, 2nd, and 3rd year None
Schedule	Continue to the next academic year Period: Other
Room	その他
Type of Class	Practical Subject
Course Objective	The aim of this seminar is for the student to design and perform scientific research, and to discuss and present the results obtained from the research. The research will be performed with advice of the supervisor.
Learning Goals	The student will obtain the ability of researchers, i.e., searching the research theme, designing the research plan, performing the research, and preparing scientific papers.
Requirements, Prerequisites	
Special Note	
Class Plan	1. Searching the research theme 2. Designing the research plan 3. Performing the research 4. Preparing the scientific paper We focus on the study of functional supramolecular science, science of non-covalent bond such as host-guest interactions and antigen-antibody reactions. Functional supramolecular systems or materials will be developed.
Independent Study Outside of Class	The tasks listing in the Class Plan will be done also outside of class. For example, attending international symposiums, presenting our study, and discussions with various professors active in the fields of science and technology.
Textbooks	Not suggested.
References	
Grading Policy	Evaluated by performance of the research and the scientific papers prepared.
Other Remarks	

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