Genetics

Course Code	Course	Credit	Content of Subject
40COM013**	Life Science Retreat I	1	Students and faculty members who are involved in life science research gather for academic exchanges. First-year students in the Five-year Doctoral Program present their research plan and progress.
40COM014**	Life Science Retreat II	1	Students and faculty members who are involved in life science research gather for academic exchanges. Second-year students in the Five-year Doctoral Program present their research progress.
40COM015**	Life Science Retreat III	1	Students and faculty members who are involved in life science research gather for academic exchanges. Third-year students in the Five-year Doctoral Program or first-year students in the Three-year Doctoral Program present their research plan and/or progress.
40COM016**	Life Science Retreat IV	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fourth-year students in the Five-year Doctoral Program or second-year students in the Three-year Docctoral Program present their research progress.
40COM017**	Life Science Retreat V	1	Students and faculty members who are involved in life science research gather for academic exchanges. Fifth-year students in the Five-year Doctoral Program or third-year students in the Three-year Docctoral Program present their research progress.
40GNT001**	Molecular and Cellular Biology 1	1	Basic features of molecular and cellular biology will be lectured and discussed. These include regulation of transcription and translation, protein structure and function, post-translational modification, structure and dynamics of chromosome.
40GNT002**	Molecular and Cellular Biology 2	1	Basic features of molecular and cellular biology will be lectured and discussed. These include dynamics of cell, organelles and cytoskeleton, metabolism, protein traffic, signal transduction and cell imaging.

40GNT004**	Developmental Biology 1	1	Various developmental events, such as cell fate determination, cell differentiation, morphogenesis and animal behavior will be analyzed in light of gene expression, cell–cell interaction, intracellular signaling and evolution. Classes will be run by critical reading of the primary literature and discussion.
40GNT005**	Developmental Biology 2	1	Various developmental events, such as cell fate determination, cell differentiation, morphogenesis and animal behavior will be analyzed in light of gene expression, cell–cell interaction, intracellular signaling and evolution. Classes will be run by critical reading of the primary literature and discussion.
40GNT006**	Evolutionary Genomics	1	After introduction of basic knowledge on various fields of evolutionary and population genetics, such as adaptive evolution, neutral evolution, speciation, and symbiosis evolution, we discuss what kinds of new questions will be possible to asnswer by employing emerging genomic technologies.
40GNT007**	Genetics	1	This lecture focuses on how to proceed life science researches based on genetics, introducing the various model organisms. The advantages and disadvantages of each model organism as well as the phenomena and the universal laws of genetics will be lectured. This lecture will help students to comprehend the basic concepts, approaches and current techniques in genetics, including diversity of living organisms.

40GNT008**	Oral Scientific Communication 1	2	Practical, small-group seminar to develop skills for logical and effective communication of research content and themes. The course highlights difficulties faced by scientific presentation audiences to comprehend data and the meaning and significance of research findings. Participants learn effective strategies and concepts to overcome these difficulties through practical activities and learn to present and discuss their research in a logical and easy-to-comprehend manner. Course participants have the opportunity to present their own research and receive feedback and suggestions from NIG faculty and researchers.
40GNT003**	Oral Scientific Communication 2	1	Scientific seminars are a very important source of information for scientists; however, effective comprehension of seminar contents requires sufficient knowledge of both language and science. This course aims to increase students' comprehension of seminar contents. Students discuss the contents in English and deepen their understanding of the contents.
40GNT009**	Fundamentals of Scientific Writing	1	This course will explore principles of scientific writing in English. Lectures, in-class discussions and assignments will focus on developing judgement or taste in evaluating existing material and on implementing such skills to improve one's own writing. Topics will include fundamentals of writing (e.g., sentence construction, transitions, cohesion) as well as specifics of preparing scientific papers and proposals as well as professional material such as applications.

40GNT010**	Genetics Seminar Ⅰ	1	National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of first-year students.
40GNT011**	Genetics Seminar Ⅱ	1	National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of second-year students.

40GNT012**	Genetics Seminar Ⅲ	1	National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of third-year students.
40GNT013**	Genetics Seminar Ⅳ	1	National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of fourth-year students.

40GNT014**	Genetics Seminar Ⅴ	1	National Institute of Genetics frequently holds seminars on a wide range of topics, introducing cutting-edge research in the life sciences. For example, internal exchange seminars (NIG colloquium) are held every Friday, and biological symposiums and biological webinars are held with prominent researchers from Japan and abroad. Students attend these seminars and participate in question-and-answer sessions and discussions to develop their skills as researchers. By being exposed to cutting-edge research, students acquire broad knowledge across disciplines and develop logical thinking skills. They also develop skills in effectively asking questions and developing scientific arguments. Based on the submitted reports and the content of the question-and-answer sessions, students are judged to have the level of comprehension, thinking, and discussion skills required of fifth-year students.
80GNT001**	Genetics Progress ⅠA	2	Conducted during the first 3-4 months of enrollment. One-on-one meeting with a progress committee member (chair). Students prepare presentation materials and explain their research topics and plans to the committee member. Students deepen their understanding of their own research by answering questions and receiving advice from the committee member. After the interview, students receive a written report from the committee member with his/her evaluation and advice, which will be used as a reference for the rest of their research life.
80GNT002**	Genetics Progress ⅠB	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their first year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.

80GNT003**	Genetics Progress ⅡA	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the first semester of their second year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.
80GNT004**	Genetics Progress ⅡB	2	Students prepare and submit a D2 progress report (a paper on a specific research project) summarizing the results of their research after enrollment, along with other required documents. An open oral research presentation is given and questions from the audience, including the progress committee members, are answered. A closed-door meeting with three members of the progress committee follows to discuss the contents of the D2 progress report and the research presentation in more depth. Based on these results and students' performance, students are evaluated for eligibility for the master's degree and promotion to the third year.
80GNT005**	Genetics Progress ⅢA	2	One-on-one meeting with a progress committee member (chair). Students prepare presentation materials and explain their research theme, progress, and future research plans to the committee member. For third-year transfer students who have just entered the program, the presentation focuses on their thoughts about setting up a research theme and their research plan. Students deepen their understanding of their own research by answering questions and receiving advice from the committee member. After the interview, students receive a written report from the committee member with his/her evaluation and advice, which will be used as a reference for the rest of their research life.

80GNT006**	Genetics Progress ⅢB	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their third year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members.
80GNT007**	Genetics Progress ⅣA	2	Students prepare a D4 progress report in English in the form of a doctoral thesis and submit it together with the activity report. Hold a closed-door committee meeting with four progress committee members and explain the progress of their research and future research plans to the committee members. Hold an in-depth question-and-answer session with the progress committee members and receive advice on their research and guidance on how to write their report. After the meeting, students receive a detailed report from the committee members with their evaluation and advice, which will be used as a reference for the rest of their research life.
80GNT008**	Genetics Progress ⅣB	2	Public research poster presentation to faculty members and other audiences. Students prepare a poster that clearly summarizes the progress of their research up to the second semester of their fourth year and their future plans, explain it to the audience, and obtain feedback on their research. Prior to the poster presentation, a short oral presentation in English is given to the entire audience to effectively present their research. After the poster presentation, students prepare an assignment report listing the questions they were asked about their research and the answers they received, which will be reviewed by all faculty members and used as a reference for the completion of the students' doctoral thesis in one year.

80GNT009**	Genetics Progress ⅤA	2	Stundets give a public oral presentation of their research during an internal exchange seminar (NIG colloquium) held every Friday afternoon at the National Institute of Genetics, followed by a question-and-answer session with the audience. Afterwards, students hold a closed-door meeting with the four progress committee members to explain the progress of their research and future research plans to the committee members. Discuss in detail the content of the doctoral thesis and establish a common understanding between the committee members and the student regarding the content of research worthy of the degree level.
80GNT010**	Genetics Progress ⅤB	2	After careful discussion with the supervisor, students prepare a draft of the doctoral thesis, which is evaluated (commented) by the progress committee. This is an opportunity for students to improve the quality of the doctoral thesis based on the comments. If the progress committee determines that the doctoral thesis is not complete enough to proceed to the doctoral thesis evaluation, no credit is given and students are not be allowed to apply for the doctoral thesis evaluation.
80GNT011**	Genetics Reading Seminar ⅠA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their first year, and to be able to make valid arguments.

80GNT012**	Genetics Reading Seminar ⅠB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their first year, and to be able to make valid arguments.
80GNT013**	Genetics Reading Seminar ⅡA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their second year, and to be able to make valid arguments.
80GNT014**	Genetics Reading Seminar ⅡB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their second year, and to be able to make valid arguments.

80GNT015**	Genetics Reading Seminar ⅢA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their third year, and to be able to make valid arguments.
80GNT016**	Genetics Reading Seminar ⅢB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their third year, and to be able to make valid arguments.
80GNT017**	Genetics Reading Seminar ⅣA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their fourth year, and to be able to make valid arguments.

80GNT018**	Genetics Reading Seminar ⅣB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their fourth year, and to be able to make valid arguments.
80GNT019**	Genetics Reading Seminar ⅤA	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the first semester of their fifth year, and to be able to make valid arguments.
80GNT020**	Genetics Reading Seminar ⅤB	2	Introduce, explain, and discuss the latest life science articles through journal clubs and reading groups. Students learn to read the contents of scientific articles or textbooks, to judge whether the author's claims are justified by the evidence presented in the article or by the findings already accepted by academic societies, to participate in discussions among attendees regarding the contents and logic of scientific articles or textbooks. The goal of the course is for students to acquire logic appropriate for students in the second semester of their fifth year, and to be able to make valid arguments.