Basic Biology

Course Code	Course	Credit	Content of Subject
40COM003**	Practical Spoken English 1	1	The course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM004**	Practical Spoken English 2	1	Following "Practical Spoken English 1", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM005**	Practical Spoken English 3	1	Following "Practical Spoken English 2", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM006**	Practical Spoken English 4	1	Following "Practical Spoken English 3", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM007**	Practical Spoken English 5	1	Following "Practical Spoken English 4", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM008**	Practical Spoken English 6	1	Following "Practical Spoken English 5", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM009**	Practical Spoken English 7	1	Following "Practical Spoken English 6", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM010**	Practical Spoken English 8	1	Following "Practical Spoken English 7", the course focuses on improving and building the communication and presentation skills necessary for researchers.
40COM011**	Practical Spoken English 9	1	Following "Practical Spoken English 8", the course focuses on improving and building the communication and presentation skills necessary for researchers.

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Course Code	Course	Credit	Content of Subject
40COM012**	Practical Spoken English 10	1	Following "Practical Spoken English 9", the course focuses on improving and building the communication and presentation skills necessary for researchers.
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.

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40BBL001**	Developmental and Regenerative Biology	1	Multicellular organisms develop from a single cell —a fertilized egg—through repeated cell divisions, cell differentiation regulated by tissue interactions, and three-dimensional morphogenesis, eventually producing offspring through reproduction. This course covers essential developmental processes, including body axis formation, cell differentiation, cell movement, and metabolic regulation. In addition, we will explore fundamental questions about reproduction in various animals, plants, and unicellular eukaryotes. Further, the mechanisms of regeneration will be discussed in comparison with developmental events.
40BBL002**	Evolution and Environmental Biology 1	1	(Jun Minagawa) Fundamental principles, structural basis, molecular mechanisms, and analytical methods, with a particular focus on the light reactions of photosynthesis.(Mitsuyasu Hasebe) The basic principle of diversity formaition and evolution in Bryophytes, Lycophytes, Pteridophytes, and Spermatophytes will be discussed. (Miyo Terao Morita) An overview of the transport and signaling of the phytohormone auxin, which plays an important role in the gravity response of plants. (Yasuhiro Kamei) An overview of the molecular mechanisms of cells against temperature, and introduction of an application method using the mechanism to biological research. (Kenji Takizawa) An overview of the coevolution of planetary environments and photosynthetic organisms. (Makio Yokono) An overview of the evolutionary history of photosynthetic organisms adapting to various light environments.

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Course Code	Course	Credit	Content of Subject
40BBL003**	Evolution and Environmental Biology 2	1	The course will introduce topics on modern evolutionary biology covering the fundamentals of the methods for comparative genomics analyses. The first topic includes variant detection, orthology analysis, whole genome comparison and detection of selection signature. Continuously, it will introduce the evolutionary mechanism that brings about the diversity of organisms. The evolutionary novelties acquired by insects through evolution will be discussed. Arbuscular mycorrhiza and root nodule symbioses are mutually successful and beneficial interactions on earth. The evolution of plant–microbe symbioses by recruiting or neo–functionalizing common factors will be discussed. Some of the organelles that support eukaryotic cell function are thought to have been symbiotic within the cell by microorganisms of other origin. The acquisition of chloroplasts is presented as an example of this. Most organelles also flexibly change their function, size, number, and morphology in response to their environment. Chloroplasts, peroxisomes, vacuoles, and lysosomes are presented as examples of this ability to adapt to the environment.
40BBL004**	Bioimaging	1	This course will introduce various methodologies in modern bioimaging that visualize biological structures and phenomena in molecular, cellular, tissue and organism levels, and also image processing/analysis techniques to extract useful information from the obtained digital image data.
40BBL005**	Bioinformatics	1	This two–day intensive course will cover the fundamentals of bioinformatics, with a primary focus on sequence analysis. Topics will range from the basic algorithms used in sequence analysis to the application of bioinformatics in genomic and transcriptomic analyses. The course will consist of both lectures and hands–on activities.
40BBL006**	Introduction to Basic Biology 1	2	Introduction of the research conducted at NIBB by all professors, associate professors, and assistant professors. The 1st part will be offered in the first semester.

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Course Code	Course	Credit	Content of Subject
40BBL007**	Introduction to Basic Biology 2	2	Introduction of the research conducted at NIBB by all professors, associate professors, and assistant professors. The 2nd part will be offered in the second semester.
40BBL008**	Advanced Conference 1	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 1, and in other years as the Advanced Conference 2 through 5.
40BBL009**	Advanced Conference 2	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 2, and in other years as the Advanced Conference 1, 3 through 5.
40BBL010**	Advanced Conference 3	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 3, and in other years as the Advanced Conference 1, 2, 4 and 5.
40BBL011**	Advanced Conference 4	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 4, and in other years as the Advanced Conference 1 through 3, and 5.
40BBL012**	Advanced Conference 5	1	Attending an international meeting held at NIBB, students are exposed to frontier research topics and engage in discussion about them. As the international meeting will focus on a different research theme every year, the course is offered once every five years as the Advanced Conference 5, and in other years as the Advanced Conference 1 through 4.

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Course Code	Course	Credit	Content of Subject
40BBL013**	Basic Biology Seminar Ⅰ	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar Ⅰ to Ⅴ is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 1 students are recommended to attend many seminars that are closely related to their own research theme to cultivate a better understanding.
40BBL014**	Basic Biology Seminar Ⅱ	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar Ⅰ to Ⅴ is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 2 students are recommended not only to listen passively, but also to actively ask questions, and write down the content in their reports.
40BBL015**	Basic Biology Seminar Ⅲ	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar Ⅰ to Ⅴ is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 3 students are recommended to participate in seminars in a wide variety of fields to broaden their horizons.

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Course Code	Course	Credit	Content of Subject
40BBL016**	Basic Biology Seminar Ⅳ	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar Ⅰ to Ⅴ is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 4 students are recommended to participate in seminars to find out what will contribute to their own research.
40BBL017**	Basic Biology Seminar Ⅴ	1	Attend seminars held in NIBB and participate in their discussions. Choose 5 or more of the seminars, and write reports on their content and the points which draw your interest. The goal of Basic Biology Seminar Ⅰ to Ⅴ is to acquire a wide range of knowledge over different fields and to develop logical thinking skills by contacting with the cutting-edge research seminars, as well as to develop skills of scientific discussions. Year 5 students are recommended to participate in as wide a range of seminars as possible, keeping in mind that they will be useful for consideration in choosing a career path and research content after obtaining a PhD degree.

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Course Code	Course	Credit	Content of Subject
80BBL001**	Basic Biology Progress ⅠA	2	Receive guidance and advice on research progress and future directions at meetings with their assigned Progress Committee members. I to V correspond to the grades, taken in the order of A and B.
80BBL002**	Basic Biology Progress ⅠB	2	
80BBL003**	Basic Biology Progress ⅡA	2	
80BBL004**	Basic Biology Progress ⅡB	2	
80BBL005**	Basic Biology Progress ⅢA	2	
80BBL006**	Basic Biology Progress ⅢB	2	Receive guidance and advice on research progress and future directions at meetings with their assigned Progress Committee members. I to V correspond to the grades, taken in the order of A and B.
80BBL007**	Basic Biology Progress ⅣA	2	
80BBL008**	Basic Biology Progress ⅣB	2	
80BBL009**	Basic Biology Progress ⅤA	2	
80BBL010**	Basic Biology Progress ⅤB	2	

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Course Code	Course	Credit	Content of Subject
80BBL011**	Basic Biology Reading Seminar ⅠA	2	Participate in journal clubs held by researchers in your laboratory and related fields to introduce, explain, and discuss the latest life science articles. I to V correspond to the grades, taken in the order of A and B.
80BBL012**	Basic Biology Reading Seminar ⅠB	2	
80BBL013**	Basic Biology Reading Seminar ⅡA	2	
80BBL014**	Basic Biology Reading Seminar ⅡB	2	
80BBL015**	Basic Biology Reading Seminar ⅢA	2	
80BBL016**	Basic Biology Reading Seminar ⅢB	2	
80BBL017**	Basic Biology Reading Seminar ⅣA	2	
80BBL018**	Basic Biology Reading Seminar ⅣB	2	
80BBL019**	Basic Biology Reading Seminar ⅤA	2	
80BBL020**	Basic Biology Reading Seminar ⅤB	2	